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Silk production and its impact on families and communities in Oaxaca, Mexico

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by

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ABSTRACT

This study documents silk production in Oaxaca, Mexico, and how the families and communities have changed and embraced new technology without sacrificing their culture, adapting to economic situations over time by changing their income sources. Because agriculture no longer generates a viable income, people have revived the production of silk. Many families plant produce for their own consumption and have another source of income in addition to the silk. However, many of the older women spoke of always having their main income from silk.

Silk has been a means of income in Oaxaca since silkworm graine was introduced by the Spanish in the 1500s. There have been times when silk production almost disappeared, but each time it was revived. The current expansion of silk production has been assisted by the Mexican government in its recognition of the importance of indigenous crafts. The government has implemented programs to assist organized silk producing groups by offering loans and grants to purchase equipment and hire teachers. The government supplies mulberry trees in the spring and silkworms twice a year to all individuals and families producing silk. These hybrid silkworms spin larger cocoons that have more fiber than the criollo silkworm cocoons brought to the area by the Spanish, but almost all of the people still raise the criollo in addition to the hybrid. The only requirements for receiving silkworms is that the individual or group have enough trees to feed the silkworms and that they make a profit.

Most of the silk is woven into rebozos (shawls) with one or more members of the family involved in the spinning, weaving, and dyeing processes. Electric spinners and floor looms have been introduced by the government to enhance the spinning and weaving

process, but many people, particularly the older women, still prefer to spin by hand using a malacate and weave using a backstrap loom. There are debates between the people as to which methods produce a better product. However, there is an agreement that it is better to use natural dyes and the people in the communities have brought back this almost forgotten art.

CHAPTER 1. INTRODUCTION

Silk: The Fabric of My Life

Fabric has always been a part of my life. No matter what was happening in my life, I could count on fabric to draw my focus away from any problems. If life was trying, I would sew to make myself feel better. If life was good, I would sew to feel even better. I enjoyed creating the clothing that existed in my imagination.

I am a very tactile person and like the feel of fabric against my skin with some fabrics feeling better than others. I began my fabric experience with cotton that, along with an occasional brocade or fur, was available in scraps for doll clothing. Later I used cotton as well as the 1970s version of polyester for my clothing. As time went on, I was introduced to rayon, linen, wool, and silk. I also explored flowing diaphanous chiffon, a stiffer but translucent organza, and a softly flowing charmeuse. All three fabrics can be made using silk, as well as other fibers.

Over the years, I have sewn and experimented with many different fabrics. My favorite fabric has become silk with its seemingly delicate flowing nature of supple folds. I agree with Feltwell (1990), “One hundred per cent silk garments hang very delicately and give materials an extra appeal over other fibers” (p. 124). Silk has a sensuous feel against my skin, whether as a charmeuse or chiffon. My fascination with silk has led me to explore dyeing and painting silks as a means of creating scarves and clothing and producing colors ranging from muted to vibrant. As I work with silk, I think of the way it is produced, by the silkworm producing a cocoon, and how it is mass produced in China and Thailand.

My fascination with silk has also led me to investigate silk’s creation. I have seen silkworms devouring mulberry leaves and spinning their cocoons. I have heard them

crunching on the leaves as they eat constantly day and night pausing only when they molt their skin until they are ready to spin their cocoon. The metamorphosis of the *Bombyx mori* is described in Borah (1943), de Maria y Campos and Castelló Yturbide (1990), and Feltwell (1990) with the originally tiny caterpillar (1 mm or approximately 1/32 inch) molting its skin four times as it grows to its mature length of 70 to 80 mm (2.75 to 3.15 inches). When the caterpillar reaches maturity, it attaches itself to a twig and spins its cocoon producing the silk fiber. The length of silk fiber from cocoons varies. According to Feltwell, the average length ranges from 400 to 600 m (437.44 to 656.16 yards). If the silkmoths are allowed to emerge from the cocoon, they are unable to fly because of breeding. Selective breeding has occurred to increase the amount of silk fiber obtained from larger cocoons spun by larger silkworms. Only a small percentage of the moths are allowed to hatch in China and Thailand, with the finest female cocoons selected for this purpose. When the moths hatch, they have a very short life that consists of mating, laying eggs, and dying. The eggs, called graine, hatch and the process begins again. The remaining cocoons are steamed to kill the moth so that the silk can be removed as one long fiber. A boiling water process helps loosen the sericin, the glue from the caterpillar that binds the cocoon together. The silk is then reeled from the cocoon, combining the fiber with those from other cocoons and adding a small amount of twist. The number of fibers combined and the amount of twist varies depending on the weight or denier desired for the resulting yarn.

Silk is not something I normally associate with Mexico. Living and growing up in the San Joaquin Valley in central California, I have been exposed to Mexican culture due to the large number of immigrants from Mexico who reside in the valley. The valley has large and small agricultural farms producing a variety of crops year-round. Many people from Mexico

first came to the valley to work as farm laborers. There are many other cultures (Southeast Asian, Armenian, East Indian, Native American, and African-American) where I live with many festivals and functions celebrating individual cultural aspects of dance, clothing, art, food, and language. I find the clothing, fabric, and adornment from the different cultures fascinating and pay special attention to construction details. Although I have seen the East Indian women wearing silk and the Mexican women wearing cotton and wool clothing, I have never seen the Mexican women wearing silk.

My interest in doing this study is due to my interest in silk and the clothing of different cultures. I wanted to see how silk is produced by individuals and families. I wanted to learn about the processes involved, from raising the silkworms through to the finished product. I wanted to learn what influenced their decision to weave silk shawls.

Why Oaxaca, Mexico

I knew sericulture, the production of cultivated silk, had been tried in parts of North America, but I did not know specific details. Nor did I know that sericulture was still active in parts of Mexico. I learned about a tour that included visiting silk producers in the state of Oaxaca (wə'ha:ka), Mexico and was immediately interested. In experiencing Mexican culture where I live, I have thought of Mexico in terms of pottery, spinning and weaving wool and cotton, and dyeing yarns with purple shellfish and red cochineal insects. I never thought of silk production and never imagined mulberry trees growing in Mexico. Understanding how silk production came into Mexico, how it survived over the years, how it was being produced within the small communities, and what the impact of its production has been on the families appealed to me. I began investigating ways to explore only the silk production communities.

I began internet correspondence with Eric Mindling (personal communication, July 25, 2005), who lives in Mexico part-time and conducts tours in the state of Oaxaca. He identified the two communities of San Pedro Cajonos and San Mateo Peñasco where silkworms are raised and silk yarn is spun. The yarn is woven into rebozos (Spanish for shawls) in San Pedro Cajonos. He also mentioned San Miguel Cajonos, less than one mile from San Pedro Cajonos, as another possibility. According to Mindling, sericulture is a cottage industry with only a few people in these communities participating in the industry. He indicated he would be able to help me visit these communities. He also recommended Woodrow Borah's *Silk Raising in Colonial Mexico* (published in 1943). I was intrigued.

I read Borah's book and wondered whether the women in the communities mentioned by Mindling still used the silkworms descended from the graine brought to Mexico by the Spanish. What stories would these women be able to tell? What could be learned by listening to the women talk about their craft, their traditions, and the history of their lives as it revolves around silk production? How are their families involved in or affected by silk production? Is any government assistance provided for the women producing silk? How has the production of silk and government intervention affected or changed the traditions and culture of these communities?

In researching the subject of silk production in Oaxaca, three books were immensely valuable: *The Unbroken Thread: Conserving the Textile Traditions of Oaxaca* (de Ávila Blomberg [Klein, Ed.], 1997), *Historia y Artes de la Seda in México: Siglo XVI-XX* (de Maria y Campos & Castelló Yturbide, 1990) available only in Spanish, and *Great Masters of Mexican Folk Art: From the Collection of Fomento Cultural Banamex* (de Calderón, Sarmiento, & de Álvarez, Eds., 1998). The first two books cited Borah (1943) on the history

of silk production in Mexico. In Klein's book, de Ávila Blomberg wrote that people in some areas of Oaxaca had produced silk in years past and programs were available to assist those who wanted to produce silk. This discussion focused on the production and fiber with no mention of the women who produced silk, their families, income, and culture. The second book focused on current and future silk production and dyeing in Mexico and included a section that described the superstitions revolving around the raising of silkworms. It stated that silk production could provide a viable income for the women, but provided no details about how this would be accomplished. The section on the women producing silk only identified who was producing the silk, but it did not provide any information regarding income from silk sustaining the women or their families or family involvement in silk production.

The third book is a compilation of specific people involved in folk arts in Mexico. One section mentioned several individuals who wove cotton rebozos with intricate designs. Only two women were mentioned who wove silk, Isabel Rivera Díaz and Julia Sánchez Vargas. Both lived in the state of San Luis Potosi, far north of Oaxaca. These two women wove patterns into the silk and knotted the fringe. Both began weaving rebozos in the 1950s, but there was no mention of the date when they began weaving silk or if the women raised the silkworms. Both of the women taught weaving with an implication that the women supported themselves with their weaving.

According to Grace (2004), two communities in Mexico still produce silk and receive some assistance from the Mexican government. She visited the area in 2001 and again in 2003, but has been unable to continue to research silk production in Oaxaca due to personal circumstances. She felt this was a subject of importance to others researching textiles and

cultures. Some of the questions she wanted to pursue included: Are the people in the communities holding on to traditions or are traditions changing? If change is occurring, is the change occurring quickly or slowly over time? Is the government still providing assistance? Is the government assistance helping to keep traditions of the past or is the assistance creating new traditions? Are the changes creating better lives for the women and their families? (personal communication, July, 15-17, 2006)

Impact of the Research

The history of a people shapes their present and future and their arts. Textiles are one of the arts that can reveal how the people spend their time and what is important to them. The textiles also serve as a filter through which they interpret the world and other people. This inquiry expands the stories of the silk communities of Mexico. My research documents how the communities and the families within the communities change and embrace new technology without sacrificing their culture and adapt to economic situations over time by changing their income sources.

Silk is being produced in Mexico using spinning and weaving techniques that have been passed down through generations. The increase in silk cultivation may change the traditions and culture of the people producing silk. The evolution of silk textiles can reveal more about the culture of these people than the political history of the community. The evolution of silk cultivation in these mountain communities reveals how families have kept alive some traditions and altered others in order to produce a better quality product unique to their culture. This research chronicles the changes that have taken place as well as those changes that are in process.

By recording how this small, isolated industry has survived since its introduction in the 1500s and how it has evolved provides information about the culture and its traditions. Some historians, including Borah (1943) have written about how the production of silk and silk products had totally disappeared in Mexico; however, it was maintained, albeit on a very small scale until recent years. This study records changes that have been made over the years, including assistance from the Mexican government. According to Grace (2004), the Mexican government is trying to introduce the Chinese *Bombyx* silkworm to produce a finer fiber than is currently being used for weaving. Silk production could also be important to the local economics as exports of silk products to the United States markets or to tourist markets within Mexico.

The all-encompassing questions of how the families and communities have been able to change, how they have been able to embrace new technology without sacrificing their culture, and how they have adapted to economic conditions are the focus of the research. The following subquestions provide in-depth information in answering the overall questions.

- How has silk cultivation survived over time?
- What effects does silk production have on family roles?
- What impact has there been on the economy or income of the individual household?
- How has silk production changed or influenced the community?
- Have traditions and culture changed within the family and community? Have new methods in the production of silk been added?
- Have new methods, techniques, or technologies in the production of silk been added?
- What assistance does the Mexican government provide to those producing silk and what influence does this assistance have on the families involved in silk production?

Silk production is unique to this area. Van Maanen (1988) stated that cultures having a low visibility or being out of the ordinary are studied in ethnographies. These communities were not studied in-depth as a whole. Because only the part of the community that produces silk is being studied, a more specific method of investigation is needed. Qualitative research is defined by Denzin and Lincoln (2005) as "a field of inquiry in its own right" (p. 2) and "consists of a set of interpretive, material practices that make the world visible" (p. 3) and uses interviews, conversations, photographs, and interaction. Qualitative research does not begin with theories but "with experience as expressed in lived and told stories" (Clandinin & Connelly, 2000). Rosenblatt and Fischer (1993) wrote "Qualitative family research requires in-depth and detailed information about family interactions and about the perceptions, understandings, and memories of family members" (p. 167). This study is about the community, the family, its interactions, economics, and history regarding the production of silk. To answer questions regarding the production of silk and the impact on family and culture, the people involved have been interviewed extensively. Interviewing more than one person or family produces a view of the overall effect on family, community, and culture. Because this study of silk production and the family is a specific phenomenon, a qualitative use of narrative inquiry was considered to be the best method of research. "(N)arrative is the linguistic form uniquely suited for displaying human existence. . . Narrative descriptions exhibit human activity as purposeful engagement in the world" (Polkinghorne, 1995, p. 5). The use of narratives provided the best information for analysis to answer the overall questions of the study. This analysis of the narratives examines the data to identify common themes and concepts.

In addition to the silk producing families within the communities, people outside these communities, but involved with the production of silk, were interviewed to confirm or contradict information received from the families. These sources included government employees who oversee silkworm distribution and a historian. These other sources provided the triangulation needed to establish credibility of the information gathered for qualitative research as stated by Creswell (1998) and Thorkildsen (2005). Of the various approaches used to research families (Rosenblatt & Fischer, 1993), each approach is dependent on the information needed and the nature of the study. In this case, history of the area at the time of the Spanish conquest has been recorded in books (Baskes, 2000; Borah, 1943; Chance, 1989; Chibnik, 2003; de Maria y Campos & Castelló Yturbide, 1990), but the more specific and detailed history of the communities and the families in these communities has only oral history and no recorded or written history. The narratives of this study include some of this oral history as it is pertinent to the overall analysis. Triangulation (Creswell, 1998; Thorkildsen, 2005) that developed by comparing the narratives established the data's credibility and helped "understand the fullness of human existence" (Polkinghorne, 1995, p. 8). Linking the narratives with a personal conversation of what is known by historian and botanist Alejandro de Ávila Blomberg in Oaxaca further verified the information gathered.

As a reference to the communities producing silk, Figure 1 (Appendix A) is a map of Mexico showing the location of the state of Oaxaca in Mexico and Figure 2 (Appendix A) is a map of the area around the city of Oaxaca, the capital of the state by the same name. The official name of the city is Oaxaca de Juarez. Using the city of Oaxaca as a reference point, Teotitlán de Valle and Tlacolula are south, San Mateo Peñasco is west, and the other communities are east.

CHAPTER 2. LITERATURE REVIEW

History of Oaxaca

The state of Oaxaca is located in southern Mexico (see Figure 1, Appendix A) with a very rugged, mountainous terrain surrounding the Valley of Oaxaca (Chance, 1989). The geography includes very high ridges surrounding high valleys, deep canyons, and narrow ravines. Most of the area is heavily forested. The Cajonos Zapotec area is semiarid and the driest of all the area with a wet season from May to October. Baskes (2000) agrees with Chance that within Oaxaca, there were fifteen major linguistic groups at the time of the Spanish Conquest. The Mixtec in the west and the Zapotec in the east were the two dominant groups. Figure 3 (Appendix A) shows the linguistic regions in the state of Oaxaca circa 1519. Within the Zapotec linguistic group, there were from nine to forty or more variations of the language. The four northern Zapotec languages shared grammatical and semantic features that were unique from the other variations within Oaxaca. There are six specific Zapotec languages identifiable in recent times (González Lincón, 2001) .

The rugged Mixtec area consists of three major divisions (Baskes, 2000), Mixteca Alta, Mixteca Baja, and Mixteca de la Costa. The Mixteca Alta region begins forty miles west of the city of Oaxaca and has high peaks with small valleys running in a north-south direction. Mixteca Baja is northwest of Mixteca Alta and “somewhat warmer, lower, and drier” (Baskes, p. 15). Mixteca de la Costa “rises from the Pacific Ocean into the more mountainous areas that border Mixteca Alta and Mixteca Baja” (Baskes, p. 15).

The Valley of Oaxaca was a major power center for more than fifteen hundred years before the Spanish arrived (Chance, 1989). It “gave rise to the most developed forms of indigenous sociopolitical organization in ancient Oaxaca” (Chance, p. 3). Monte Albán, set

on a mountain top, was the site of the state organization that dominated the valley. Monte Albán had a population of 30,000 to 60,000 between 400 A.D. and 600 A.D. (Stephen, 2005) and offered military protection in addition to its religious influence, but did not interfere in the trade of the surrounding communities. It was abandoned by 800 A.D. The ruins contain architectural complexes and hieroglyphic writings of the highly developed society. The small town-states were very unstable and there was constant warring, which resulted in the Mixtec and Aztecs occupying most of the valley by 1521 when the Spanish arrived (Chance).

The Zapotec and the Mixtec were dependent on agriculture (González Lincón, 2001). However, the Zapotec were also extremely skilled architects, creating Monte Albán, whereas the Mixtec were more skilled in sculpting, especially on their buildings. González Lincón stated that the Zapotec are called Ben Zaa, or Cloud Peoples, and their origins date back to 2000 B.C.E., whereas the Mixtec early civilization traces back to 1500 B.C.E.

With the arrival of the Spanish, Oaxaca was divided into political jurisdictions (Chance, 1989). Figure 4 (Appendix A) shows these divisions. Figure 5 (Appendix A) shows how the colonial administrators divided the Villa Alta region by the language spoken in the specific area. The small amount of information known about the pre-Hispanic societies in this region is based on oral tradition. Due to its ruggedness, the Sierra Zapotec region was relatively impervious to outsiders. Even the Aztecs had little penetration into this region. Its poverty might also have contributed to its isolation. At the time of the Spanish conquest, it was less civilized and less politically developed than the communities in the Valley. The communities in the Sierra area were independent of each other. Although no one community led the others, they were in a state of war when the Spanish arrived. One possible reason for these wars was the acquisition of land. The steep mountainous terrain was not conducive to

intensive farming, but many of the peasants pursued agriculture. The Spanish proceeded into the area at a very slow pace because the only way into the mountains was by foot paths too rugged for horses and the Indians were extremely hostile. The few Spaniards who went into the area relied on the indigenous Indians for subsistence. The Indian economy depended on corn and cotton. Cotton was spun and woven into cloth by the women in the communities. Trade between the Indians and the Spanish was established slowly.

The indigenous people and their communities controlled most of the agricultural land into the eighteenth century and produced crops of their choice in the mountain areas as well as the Valley of Oaxaca (Chance, 1989; Chibnik, 2003). This might be because other areas of Mexico were more conducive to growing crops and mining and, thus, more valuable to the Spaniards, who wanted to become wealthy. The Spanish brought new technology in the way of oxen and plows, but the communities themselves were somewhat left alone. The idea of self-governing communities was reinforced by Florencio Moreno (personal communication, November 3, 2006), who owns a tour company and provided a wealth of information on the communities' history and current political structure. According to Florencio Moreno, the very arid area in the Valley of Oaxaca did not supply the Spanish with needed income. Based on information from the literature and from interviews, there were few, if any, personal interrelationships between the Spanish and the Indians and the communities remain ethnically the same as they were before the Spanish Conquest.

Trade between the Spanish and the Indigenous Peasants

Trade was established using the *repartimiento* system, administered by the *alcaldes mayores*, or district magistrates (Baskes, 2000). This system was in use in the Mixteca Alta region in 1560, but its actual origin is unknown. It may have evolved from the Aztec tribute system, but was more likely introduced by the Spanish and altered to fit the economic system of colonial Spanish America. In the repartimiento system, the peasants borrowed money from the alcaldes mayores to purchase supplies to raise crops or cochineal, an insect that produces a brilliant red dye. The alcaldes mayores were paid back at a later time in goods or products. The alcaldes mayores then sold or traded the goods to other merchants.

According to some sources, the peasants were widely abused within this system (Chance, 1989; de Maria y Campos & Castelló Yturbide, 1990). The alcaldes mayores would force the peasants to borrow money, regardless of need. When the peasants could not repay the debt, any personal property the peasant owned would be confiscated. This abuse was most often seen in raising cochineal, where production depends on weather conditions and protection from predators.

The production of cochineal was highly developed only in Oaxaca before the arrival of the Spanish. Cochineal was used for dyeing cloth and feathers and paid as a tribute to the Aztecs (A. B. Greenfield, 2005). The value of cochineal as a dye was discovered by the Spanish as an afterthought, when they realized that they could control this red dye on the world market. Cochineal was a much better red dye than that from the kermes insect. The production of cochineal became almost as important as mining gold and silver. When the Spanish Armada was raided, cochineal was valuable to the raiders. Although there may have been some abuse of the repartimiento system, A. B. Greenfield stated that the peasants were

encouraged by the Dominican friars, representatives of the Roman Catholic Church in the area, to produce only as much cochineal as they wanted to produce. Many peasants made a good living and became wealthy producing the dye.

The abuse of the peasants was also disputed by Baskes (2000), who stated that the peasants used the repartimiento system to their advantage, using the money borrowed to purchase needed supplies. He stated that the alcaldes mayores did, at times, have difficulty collecting on their debts. Sometimes it was due to a poor crop production or the cochineal insects dying before maturity, but many times the peasants simply did not want to repay the debts. In addition, when the market price for cochineal was high, the peasants would sell directly to traveling merchants instead of giving the cochineal repayment amount to the alcaldes mayores, making the debts more difficult to collect. Baskes stated that there was very little repercussion if the payment was not received in a timely manner. The peasants would pay the debt over a long time period or never completely repay it. He stated that many historians are rethinking the influence the Spanish Crown had on the economy of the remote areas of Mexico, including Oaxaca. A new approach is that the state actually regulated the economy, with the peasants actively participating in helping to shape their economy.

While using the repartimiento system to their advantage, the peasants also used the Spanish court system to negotiate improved terms for market exchange and manipulated the system for better repayment terms or to avoid repayment altogether (Baskes, 2000). The repartimiento system was eventually banned by Spain, but this ban was ignored by many communities. There was very little trust from one community to the next due to language barriers, different customs and culture, and possibly previous battles for land, making borrowing among the communities difficult. The repartimiento system continued to be the

most efficient way for peasants to borrow money with the exact terms for repayment being specifically stated. The only other lending source was from an occasional merchant within the community or private traders.

History of Silk in Oaxaca

The Chinese dominated silk production for over 2,500 years (de Maria y Campos & Castelló Yturbide,1990; Feltwell, 1990). In 552 A.D., silkworm graine began to move out of China via what became commonly called "the silk road" in the hollow canes of two Persian monks.

Silk moved from Asia into Europe, particularly in the area of Granada, Spain, which became a major silk producer by the early 1500s (Feltwell, 1990). Spain then brought the cultivation of silk, silkworms, and mulberry trees to parts of "New Spain," the explorers name for Mexico. There were already mulberry trees, *Morus celtidifolia* or *Morus acuminate Bonplandi*, found in Mexico and the leaves of these trees were used to feed the first silkworms (Borah, 1943). These leaves were said to be heart-shaped, long and thin, and bright green. Although more tender than the red mulberry leaves from North America, these leaves were as acceptable to the silkworms as the white *Morus alba* or black *Morus nigra* mulberry leaves from European trees. The European mulberry trees were planted as the number of silkworms increased and it became more difficult to supply the silkworms with leaves of the native trees. The planting of the European trees may also have been encouraged in an attempt to improve the quality of the silk being produced.

There is no clear evidence as to who first introduced silk production to New Spain because there are several records that give dates around the same year but name different

explorers (Borah, 1943). The first try for sericulture from Spain was in Hispaniola (now Haiti). Sericulture might have been successful, except priority was given for using the native Indians to raise food and work in the gold mines. A second try was in the West Indies in 1517. Bartolomé de las Casas persuaded King Charles V to take settlers to the West Indies. Unfortunately, so many peasants volunteered to leave Spain that the noblemen forbade any of their villagers to leave and the effort died. A third try was in 1521 by Lúcas Vásquez de Ayllón, who wanted to explore and settle part of the southeastern United States using sericulture as one of the industries to be established. He was granted permission in 1523, but there is no evidence that sericulture was ever undertaken.

Four explorers who did bring sericulture into New Spain all claim to be the first (Borah, 1943). Hernán Cortés and Diego Delgadillo have the most written support regarding their claims. In 1522, Cortés asked the Spanish government for seed, mulberry trees, and graine, which he received in 1523. He began a sericulture industry south of Mexico City, in Coyoacán, and by 1530 ordered more graine from Spain. Delgadillo related Cortés request for silkworms to the court, but Delgadillo insists that he is the first person to bring sericulture to New Spain. Delgadillo had a garden of mulberry trees on the road to Chapultepec outside of Mexico City where he successfully raised silkworms. The other two men who claim to have first brought sericulture to New Spain are Juan Marín and Hernando Marín Cortés, natives of Murcia, but there is very little written about them. They might have been employed by Cortés or Delgadillo, or their claims may have been exaggerated. There is also a statement made by Motolinía, an observer of the time, who stated the sericulture industry was started by Antonio de Mendoza in Mixteca; however, the other four claimants were in New Spain several years before de Mendoza.

By 1531, Fray Juan de Zumárraga and five other Franciscan friars reported that the sericulture industry had become somewhat successful and more graine were being imported from Granada to be distributed to more people (Borah, 1943). Fray Zumárraga hoped this industry would help the native Indians. By 1537, sericulture had become the major cash crop, freeing some Indians from Spanish domination. Silk production thrived because the native Indians were allowed to produce silk without restrictions and were not forced to produce more than a comfortable amount. Fray Zumárraga also wanted to bring Morisco, Moors who had converted to Christianity, to New Spain to teach more Indians sericulture. Although there were Morisco in New Spain, it is not known if they taught sericulture.

Antonio de Mendoza, the first viceroy of New Spain, encouraged growth of the industry by allowing more trees to be planted and teaching more Indians to raise silkworms (Borah, 1943). By 1540, silk was the country's most important means of accruing wealth. Also at this time, the cultivation of the cochineal insect was expanded and the dye exported to Europe with silk (A. B. Greenfield, 2005). With the help of the friars converting and teaching sericulture to the Indians (Borah), the industry spread into much of the conquered land. By the mid-1500s, sericulture had achieved its greatest territorial extension. It spread throughout Mixteca, through southern and central Mexico, from New Galicia to Oaxaca and from Pánuco to Yucatán.

Over time sericulture disappeared in some areas and improved the price of the silk (Borah, 1943). Many problems were encountered. The graine would hatch at the wrong time or die. Although this was a problem encountered in all countries producing silk, it was especially noticeable in New Spain because sericulture was a new industry and new supplies of graine had to be continually shipped from Spain. In addition, the New Laws were passed

to free enslaved Indians and prohibited Spanish landowners from demanding personal services from the Indians. Thus, in the 1540s, many Indians left the silk industry where they had been forced to work as slaves. The owners had to either pay the Indians for their work or close the production facilities. The added labor costs probably contributed to a consolidation of the silk producing industry.

During the 1500s, Mexican Indians were producing silk, but it could only be woven and dyed by Spanish artisans living in Mexico (Borah, 1943). In this way, the Spanish controlled and prospered in the silk industry. Prices within the country were good and little silk was exported. The industry was stable until 1580, when it began to decline. By 1592, Chinese silk was being imported from the Philippines, although silk yarn was still being exported to Spain. The government of New Spain tried to save the industry and issued a decree stating that silk would be produced, even if it meant by force. This decree could not be enforced because when the officials abused the Indians who were producing the silk, the Indians refused to work.

Chinese yarns were added to the existing Mexican silk and turned into "velvets, embroideries, many kinds of taffetas, and silken hoods and mantels" (Borah, 1943, p. 90), a welcome variation to the silk already being produced. The importation of silk yarn did correspond with the decline of the silk production in Mexico, but probably was not the major reason for the decline. The abuse of Indians raising the silk caused some Indians to produce as little silk as possible and to cut down the mulberry trees in area villages. This Mexican legend grew during the revolution against the Spanish, stating that "the whole of Mixteca in one night hewed down all of their mulberry trees" (Borah, p. 93).

Borah (1943) also stated that the Indian population was falling due to disease brought by the European settlers. Indians succumbed to these diseases in great numbers. Examples of this decline can be seen in Oaxaca. Ixcatlán, with a population of 8,000 before the Spaniards arrived, declined to 300 by 1579. Texupa declined from 12,000 to 750. And, Nochixtlán declined from 1,060 in 1570 to 720 by 1581. These are only a few of the towns affected. This loss of population caused a great decrease in the production of silk.

The last plausible and much debated reason for the decline of the silk industry in Mexico is that the Spanish government itself shut down the industry because of the competition between Mexican and Spanish silks (Borah, 1943). Mexican writers state that Spain resented the competition and methodically destroyed all mulberry trees in Mexico. Another less extreme opinion states that although the Spanish government did try to end silk production in Mexico, they were subtle, letting the other factors of abuse combined with the Chinese silk competition help shut down the industry. It is likely that a combination of these reasons was responsible for the decline in sericulture. Before 1580, Mixteca produced approximately 20,000 pounds of clean raw silk, but by 1605 less than 1,500 pounds were produced. Although silk continued to be produced in a few areas, after 1776 the amount was so insignificant that no tax, or tithe, was collected on it. By 1801 the industry had diminished into obscurity. Latter attempts by the Spanish government to revive sericulture in Mexico might have worked except the revolution of 1810-1821 wiped out fields and groves and drove peasants into the military.

Toward the end of the 1700s there were reports of Indians spinning and weaving belts, sashes, and handkerchiefs from a wild silk (Borah, 1943). This information was of interest at that time because there had not yet been any classification of the hundreds of

moths that produce silken cocoons. Investigation of the wild silk found silken bags called *capullos de encino* (live-oak cocoons), which ranged in length from one-half to one meter long, in the temperate coastal regions of Veracruz, Puebla, and the Huaxteca Potosina. The local word for this industry was *cuahutaseda* (wild silk), a mixture of the native Nahuatl and Spanish. The Indians wove sashes and shawls for trade with other areas. This *cuahutaseda* was spun in the manner of cotton and wool, not reeled off the cocoon in one long fiber. Silk is still spun like cotton and wool in the communities of San Pedro Cajonos and San Pedro Peñasco (de Ávila Blomberg, 1997; Grace, 2004; Mindling, 2003; Sayer, 2002).

Wild silk was produced by the *Gloveria paidii*, a moth, and the *Eucheira socialis*, a butterfly, found in the Oaxaca area (de Ávila Blomberg, 1997). It is suggested by de Ávila Blomberg that wild silk was used in Oaxaca in pre-Columbian times, a theory that has been greatly debated. However, in a 1777 document, an excavation of a pre-Columbian burial site is described as containing wild silk. Grace (2004) and de Ávila Blomberg agreed that communities in Oaxaca are trying to revive sericulture by introducing Asian and European silkworm strains and using reeling techniques to spin the fibers. However, de Ávila Blomberg says that these projects "fail to appreciate the unique aesthetic qualities of traditional Oaxacan silk textiles" (de Ávila Blomberg, p. 126).

Traditions Old and New

Weaving has long been a tradition in many parts of the world. In Mexico, the Aztec goddess Xochiquetzal is given credit for the beginning of spinning and weaving (Sayer, 1977). The Aztecs linked fertility and the need for rain with the weaving process. Weaving was so respected that slaves who were talented weavers were exempted from sacrifice.

Cotton was the fiber used in weaving clothing for the elite, and ixtle (pronounced 'ēsh:lay in Spanish), a fiber from the maguey cactus, was used in weaving clothing for the common people. At the time of the Spanish Conquest, this restriction was eliminated.

The rebozo was introduced and flourished during the Spanish Colonial period (Sayer, 1977). Dörner (1962) defines a rebozo as, "a long, narrow shawl" (p. 26) used to cover the head or carry goods and young children. Dörner stated that the rebozo may be of Spanish origin or may have originated in Asia, because many women have shawl-like garments to cover their heads while working in the fields. Rebozos were made from cotton, wool, silk, and sometimes other plant fibers (Dörner; Oettinger, 1990; and Sayer, 1977). Oettinger stated that the history of the rebozo is very complex, with influences from pre-Hispanic, Spanish, and Moorish designs, along with Southeast Asian ikat, a process in which only the warp yarns are dyed in patterns. Dörner mentioned that rebozos were woven in the states of San Luis Potosi, Mexico, and Oaxaca, while Oettinger has examples of rebozos only from San Luis Potosi.

P. M. Greenfield (2004) quoted French anthropologist Claude Lévi-Strauss, who stated, "style is a statement by a culture that it differs from other cultures" (p. 149). In the Maya community of Zinacantán in Chiapas, south of the state of Oaxaca (see Figure 1, Appendix A), P. M. Greenfield documented weaving techniques that passed from mother to daughter and the changes that had been made from her first visit in 1970 to her subsequent visit in 1990. Stephen (2005) discussed weaving and Zapotec women in Teotitlán de Valle in Oaxaca and the changes that have taken place in the weaving and dyeing process. Both of these authors discuss different styles that set the communities apart from other communities within Mexico. Of particular relevance are comparisons of the communities in terms of:

- The style that sets each community apart from the others,
- The way that the traditions are passed down through generations,
- The move from agriculture to a craft for a significant portion of household income,
- The willingness to change for the betterment of the family, and
- The increase in women's education and independence.

P. M. Greenfield (2004) discussed how weaving had become more than a subsistence living for women and the traditions of passing the weaving designs from mother to daughter had changed over the years with the younger women changing the patterns and paying more attention to detail and innovation. The clothing made for other members of the community was more ornate and would bring in more income than the clothing with fewer details made for sale to tourists. One weaver stated that she was able to "weave whatever came into your head" (P. M. Greenfield, p. 18), an innovative approach that may lead to more income if also incorporated into the clothing for the tourist trade.

Weaving in Zinacantán was still done on backstrap looms in 1990 when P. M. Greenfield (2004) was in the community. Weaving tools were placed within reach of very young girls for play. The weaving tradition was passed on by observation, with young girls practicing on smaller looms. This tradition of observation and practice had not changed, but there were changes caused by contact with the outside world. The Zinacantán community remained self-governing and made use of these outside influences to enhance the culture, not diminish it. The people of the community became entrepreneurs, innovators of new ideas to earn income. One innovation was the use of acrylic yarn rather than cotton or wool yarns. Acrylic yarn is easier to use in weaving and is purchased already dyed. There was also an increase in brocade weaving, a complex process that incorporates a pattern into the weaving.

Another innovation discussed by P. M. Greenfield was that young girls spend less time as apprentice weavers and more time weaving by themselves. Although there were always young girls watching the weavers, instruction was often given by a relative or someone other than the mother. The interdependence of the women and their daughters in the weaving process had moved toward more independence on the part of the young girls. This independence was seen in the families that were more commercial in their selling.

P. M. Greenfield (2004) noted that young girls were attending school longer and their education included the use of paper patterns for weaving. There was also less of an age gap between the teachers and the students which helped the students to become more independent in their weaving by not relying on an older relative to give advice and critiques. The independence of the young girls and their knowledge of weaving gave them a marketable skill and led to less dependence on men to provide for them.

The weaving patterns before the Spanish Conquest were very lively and although the patterns continued after the Spanish arrived, there was a ban on all patterned weaving in the sixteenth century (P. M. Greenfield, 2004). The weaving patterns remained very plain until the Mexican government began to assist in transporting goods to market in the 1970s and in promoting indigenous clothing and crafts in the 1990s. With the introduction of new markets, the weaving patterns began to evolve by incorporating ancient history and religious symbols as well as flowers that symbolized the ability to grow and sell flowers rather than corn, a subsistence agricultural product. The patterns may be those of the family or Maya community or come from outside sources. The Zinacantec Mayas were undergoing a shift toward individualism in their weaving and that, “we find a tight relationship between these shifts and increasing participation in a commercial economy” (P. M. Greenfield, p.169).

In her writing about Zapotec women, Stephen (2005) also discussed the change from subsistence farming and part-time weaving to commercial weaving. Research for the first edition of her book was done between 1983 and 1990. She updated the book with another edition based on additional research conducted during the summers from 2001 to 2004. During her first visits to the community, Stephen wrote how the women in Teotitlán de Valle were becoming better educated and developing their weaving skills, giving them less reason to marry young, providing them with more political power within the community, and making them less dependent on men. Her second visits updated the information and developments in the 1990s and into 2004. She begins with the early development of wool weaving in the community.

Weaving cotton on backstrap looms was established before the Spanish arrived (Stephen, 2005). The Roman Catholic bishop assigned to Oaxaca introduced wool to the community between 1535 and 1555. He also introduced the treadle loom and taught both men and women to card and spin wool and how to weave on these looms. The wool blanket industry was well developed by the mid-seventeenth century. The patterns woven into the blankets were very complex, especially compared to that of other areas of Mexico. The industry continued to expand.

The market for the blankets was in Tlacolula when trade routes were established in the 1920s, with people from many other communities traveling there to buy and sell goods (Stephen, 2005). From 1942 to 1947, the first and second bracero programs allowed people (mostly men) into the United States on a limited-time work visa. Because many men left their community, the women took on more work at home to support their families. Upon returning home, the men used the money earned in the United States to engage in merchant activities

by purchasing wool and land and hiring laborers to work the land, moving the community toward commercial capitalism. In the 1950s the market for the blankets expanded into the national and international level and tourism increased.

Although most women could weave, the impression given to outsiders was that the men did all of weaving while the women took care of the family and home (Stephen, 2005). In actuality, the entire family was usually involved in the spinning, dyeing, and weaving process. The family labor contributed to the accumulation of capital and material assets. A merchant's workshop might include paid contract weavers as well as unpaid family members. Another situation was a merchant paying for piecework done in the weaver's home with the merchant possibly supplying the yarn and dyes to the weaver.

With the aid of the federal government, weaving cooperatives were established in Teotitlán de Valle between 1960 and 1990 (Stephen, 2005). These cooperatives were to assist with the marketing of the weaving, but many of the members found that they could sell their products for a better price in Oaxaca than through the cooperative. A women's cooperative, Women Who Weave (Te Gunah Ruindhi Laadti) was set up by Aurora Contreras Lazo [*sic*] so women and girls could be more independent. Other groups of women in the community formed their own cooperatives. These cooperatives gave the women an outlet for selling their own products. It helped them gain economic, political, and cultural rights within the community as well as within regional artisan associations. They also gained the ability to compete in the global market and gain assistance from the government. Many of the young women in the community stopped marrying at a young age and stayed independent, becoming businesswomen. The women worked together to market and sell their goods

locally during the tourist season in Oaxaca and exported goods to the United States and Europe.

The weavers in Teotitlán de Valle continued to experiment with weaving patterns and techniques (Stephen, 2005). Some of the new innovative patterns have pre-Hispanic ties and symbolism and have been passed down through a family. The design elements may correspond to local ritual and architectural elements or are from other places and indigenous groups in Mexico. It has been debated as to who actually owns the rights to these designs, but many of them have circulated throughout Mexico for centuries. These designs are used to weave blankets, rugs, shawls, and wall hangings. Many of the weavers used chemical dyes, but there has been a movement among some of the highly skilled weavers to return to natural dyes such as cochineal, indigo, barks, and lichens.

A newer traditional craft is the intricately and brightly painted woodcarvings of animals and figures, called alebrijes (alĕ'brē:hĕs) (Chibnik, 2003). The painted woodcarvings developed in the late-twentieth century because agriculture was no longer a viable source of income. At the time of his study in 1995, Chibnik found the craft had evolved from crude woodcarvings in the early 1980s into more sophisticated products. With the growth of the tourist industry and global demand for indigenous crafts, the woodcarving industry increased. Although some of the carvings "were replications of objects with long-standing cultural significance, many others were innovative hybrid art forms" (Chibnik, p. 3). The carvings involve little capital outlay and provide enough income to keep the family in the community. The carvers take pride in their work, but produce what the market wants. The highly skilled woodcarvers are also able to be more creative in doing high-priced commissioned works. The correlation between this newer tradition and the silk producing communities may be seen in:

- Possible alternative to silk production,
- A willingness to change for the betterment of the family,
- Economics of the households and income division,
- The move from agriculture as a primary income,
- Government's assistance to promote indigenous crafts,
- Political functioning of the community, and
- Self-government.

After the Mexican Revolution, which began in 1910 and lasted into the 1920s, the federal government promoted indigenous crafts in an effort to unite a population diverse along ethnic, linguistic, and political lines, and to create a national identity that blended the Indian and Spanish heritage (Chibnik, 2003). The government wanted to create national symbols of identity reflecting the pre-Columbian past of Mexico and did so by sponsoring contests and exhibitions. However, what the government saw as indigenous was actually a change from what had been produced in the pre-Columbian era. Some crafts are "complex mixtures of indigenous and Spanish technologies and artistic styles" (Chibnik, p. 7). For example, wool weaving was introduced by the Spanish in Teotitlán de Valle where originally cotton had been used. Wool weaving is now considered indigenous. Although a craft may not change, commercialization changes the meaning and the craft loses part of its value by becoming a product of wage labor, because artisans tend to produce more of the designs that sell best.

Oaxaca began to promote tourism in the 1980s by paving roads, improving air connections, and banning traffic from the zócalo, an area of outdoor cafes, musicians and artisans in the center of the city of Oaxaca (Chibnik, 2003). "Oaxaca gained a reputation in

guidebooks as a place with good climate, impressive archaeological sites, and a variety of crafts" (Chibnik, p. 12). Woodcarvings suit the tourist trade and have an advantage because they are easily portable and less expensive than other crafts. With their wide variety of shapes and colors, the woodcarvings appeal to many different customers.

The carving of animals evolved from those who carved masks and ox carts (Chibnik, 2003). Chibnik interviewed woodcarvers regarding how they decided what type of wood to use and the extent of governmental encouragement via exhibits of their work. The development and growth of several woodcarving communities between 1970 and 1985 occurred because people with connections outside the community promoted woodcarving. Woodcarving spread to other communities, such as San Pedro Cajonos, approximately 54 km from Oaxaca. Between 1984 and 1990 wood carving became the major financial income for these families. The animal carvings sold the best, but led to competition between the families as to who could paint the most ornate animals. There was also a change from water-based aniline paint to house paints that did not run or fade as much. As the craft progressed, the painting became more intricate. The division of labor has the men doing all carving with the women assisting with painting the figures. Some of the men actually paint better than they carve, but it is only the men who carve.

Organizations of woodcarvers have formed only to obtain government assistance because the government will not assist individual artisans (Chibnik, 2003). Only groups are allowed to sell from exhibits in the zócalo in Oaxaca. However, most woodcarvers do not want government assistance because there are few expenses associated with the carving.

Chibnik (2003) described the woodcarving communities as a mixture of the present with the past, with long-standing cultural traditions intermixing with recent changes. He

stated, “anthropologists have stated there are inevitably cultural losses when crafts are absorbed into the national and international marketplace” (Chibnik, p. 63).

According to Chibnik (2003) and reiterated by Florencio Moreno (personal communication, November 3, 2006), the communities are self-governed “by a civil-religious hierarchy in which adult men participate in a series of ranked, age-graded positions” (Chibnik, p. 63). Adults are required to “engage in communal labor service (tequio) on projects such as irrigation canals, harvesting, and the construction of public buildings” (Chibnik, p. 64). Florencio Moreno elaborated that the people of the communities move from one position to another, with the younger men beginning as police and moving into higher positions with more responsibility, and possibly into the position of president, or mayor, of the community. All men are required to participate in this system. This system of self-government is pertinent to all of the communities outside the city of Oaxaca.

With the change in the economy and personal situation of each household, the families divided their time among tasks best suited to the betterment of the household (Chibnik, 2003). Some family members produced woodcarvings while others were employed at another job or farmed, raising food for themselves and possibly goats or chickens for the market. It was a conscious decision for the household not to rely on just one economic opportunity. The need for additional income depended on how well woodcarving could support the household. Chibnik wrote, “The development of specializations by Oaxacan wood-carvers and many other artisans is a textbook example of a cultural evolutionary process” (p. 126). Market demand may dictate specializations causing woodcarvers to improve their skills.

Chibnik (2003) compares the financial returns on carvings to the wool rug weaving in that both types of artisans sell to intermediaries from the United States who represent dealers requesting high-end products. However, with market change, more wholesalers and dealers are personally selecting carvings to sell rather than depending on intermediaries. Chibnik stated the rug weavers had an advantage of a long-established, successful craft industry and a well-defined market that took many years to establish ties with trusted local merchants and importers from the United States. The woodcarving market is relatively young and the dealers need a "sophisticated understanding of what is likely to sell" (p. 120). The market for silk rebozos is also a developing market that needs dealers who understand the uniqueness of the silk rebozo. Woodcarving is an occupation in San Pedro Cajonos, as is silk production. At times, the two occupations overlap within families.

Others sources of change were journalists, museum personnel, and merchants (Chibnik, 2003). People purchasing crafts may read about a specific craft in a magazine, newspaper, or book and are influenced by the information provided. Information on these crafts influences public expectations as to what is good. Chibnik makes reference to a *Smithsonian* article and a subsequent book about the woodcarvers. These publications brought artisans to the attention of potential customers who wanted to purchase what was seen in the book.

Chibnik (2003) concludes that entering into the global economy has eroded the self-sufficiency of the communities, even as it elevated their standard of living. They have been assisted into this new economy by their federal and state government that provided roads and transportation and promoted tourism. Even though woodcarvers are a small part of the business world, they are structured like other global commodity chains, with intermediaries,

wholesalers, and tourists. The carvings are a unique commodity and are purchased by those seeking the unusual.

CHAPTER 3. METHOD

Introduction

The goal of this research is to understand how communities and families within the communities can change and embrace new technology without sacrificing their culture and how they have adapted to economic situations over time by changing their means of income to the production of silk. The areas of research are small communities located two or more hours' drive outside the city of Oaxaca. To understand the effect of the silk production on family economics, I interviewed those involved in raising silkworms, spinning fibers, dyeing, and weaving end products. Involvement of the Mexican government in the promotion of Mexican silk and assistance provided by the government was also investigated.

This study documented the changes that have taken place over time that affect the economy of the communities, adjustments families have made to work activities to provide adequate income, and the impact of the changes on family members and the family as a whole. It is also documented how the traditions that were abandoned in the past are being redeveloped, relearned, and incorporated into the contemporary production of silk in Mexico.

Narrative

To accomplish this study, narrative inquiry was used as the qualitative methodology for gathering data from the people producing silk. Narrative inquiry “gathers events and happenings as its data and uses narrative analytic procedures to produce explanatory stories” (Polkinghorne, 1995, p. 5). The definition of narrative as used in qualitative research has been narrowed to a specific type of discourse, the story, rather than a broader, common form of discourse and expresses the life of a person as lived. The narrative legitimizes the

values and goals of a person or culture and can convey the culture's world-view or ideology. Stories express the connectedness with life that is a unique human experience. Researchers use narratives to “try to understand the fullness of human existence” (Polkinghorne, p. 8) and “the richness and nuances of meaning in human affairs” (Polkinghorne, p. 11). Narrative may include life history and the everyday experience of an ordinary person. Studying the everyday experiences of ordinary people is a worthwhile endeavor because it helps in “understanding one's own and others' actions, of organizing events and objects into a meaningful whole and connecting and seeing the consequences of actions and events over time” (Chase, 2005, p. 656). The uniqueness of individual action is highlighted by this approach.

Blumenfeld-Jones (1995) wrote about fidelity, or integrity, in the use of narrative and how the person being interviewed entrusts the researcher to preserve the “worth and dignity” (p. 27) of the story. Emihovich (1995) stated that the researcher becomes a storyteller and interprets the stories of those interviewed from the researcher's perspective. Emihovich wrote, “emotion and reason can be linked through narratives” (p. 40) and that stories have been used by all cultures to “make sense out of experience and to preserve its meaning for future generations” (p. 40). Barone (1995) wrote about the reality that exists in the “interaction between the writer and the reader” (p. 64), where the writer conveys the meaning of the story while preserving its integrity and entices “the reader into living vicariously” (p. 66) through the story.

The similarities between the terms “life history” and “narrative” were discussed by Hatch and Wisniewski (1995). They stated that both rely on stories which are subjective accounts focusing on “life as it is lived” (p. 114) and are open to interpretation. They further

wrote that life history could be interpreted as a type of narrative which was “a way of knowing” (p. 115) that places the importance on the place of the story. Life histories generate interpretations in terms of content as opposed to focusing on how the stories were formed. “Life histories are stories of people's lives . . . the connection of one's life events to social events” (Hatch & Wisniewski, p. 115) and as such, are distinguished from other narrative forms. Narrative and life history are very personal forms of research in which the researcher works closely with those being interviewed to understand the story being told. Life history can “provide powerful insights into the process of change” (Hatch & Wisniewski, p. 118) through the interaction of the story between the history of the individual and the social history. In this study, life history is one part of the narrative that as a whole analyzes how history has affected the lives of those currently producing silk.

Some of the major issues of using narratives according to Hatch and Wisniewski (1995) are, “trust, truth telling, fairness, respect, commitment, and justice” (p. 119). There must be mutual respect between the researcher and those telling the stories. Is the story truthful? Can it be validated by the stories of others or by historical events? How can the researcher relate the complexities of a life without diminishing it to simplicity? Credibility and trustworthiness in narratives are areas that are not explored in traditional ways by qualitative research. Poststructuralism is the theory used to analyze knowledge and subjectivity within personal narratives, noting that identity and life are always in flux, never static. A story may differ depending on the audience or time, but is still the construction of a life that is changing until it ends. “Narrative includes both process and product, phenomenon and method” (Hatch & Wisniewski, p. 126) and is the way we “come to understand and communicate human action” (Hatch & Wisniewski, p. 126).

According to Polkinghorne (1995), narratives need to have a bounded system of study; boundaries define what data will be sought. Chase (2005) stated that narratives are "both enabled and constrained by a range of social resources and circumstances" (p. 656). Polkinghorne explained that the data should bring out the uniqueness of the study and "provide an understanding of its idiosyncrasy and particular complexity" (p. 15) and should answer "how and why a particular outcome came about" (p. 19). The survival of the production of silk and its affect on families and communities is a complex and unique situation in Oaxaca. Narratives supplied a view into the history of silk production in the communities and why this industry has prevailed. They provided an insight into lives of the families producing silk and the changes they have made related to their income decisions and family interactions. It is significant to understand how families have adapted their economic situations and family work structure. The information from this study could be helpful in understanding not only the communities in the study, but other cultures in which small communities have adapted to the changing global economy and how these cultures continue to evolve.

Data Collection

This study was limited to those who are involved in the production of silk in Oaxaca, Mexico, from raising the silkworms through the spinning and dyeing process to weaving and marketing of the final product. Also included in this study are those who distribute the silkworms or who assist the silk producing groups in any way.

Qualitative methodology using narratives was utilized focusing on questions to determine why or how silk production has survived for over 400 years, how it was

maintained, and its affect on families and communities today. As questions were answered, more questions arose and the answers were recorded in the narratives. Attention to the changes in the culture or traditions and whether these changes are results from government intervention were noted. The development of culture was important to examine. What can be learned from the past leads to understanding the present and can help to determine the future. Specifically for silk cultivation in Oaxaca what was learned from the past as applied to the present will help establish what is needed to define improvements for future production. What is being done now will affect the culture of the future just as the past has affected the present.

According to Clandinin and Connelly (2000), narrative inquiry involves continuity and interaction. As the researcher, I was involved in the conversation through a translator, interacting with the people sometimes during meals. My understanding of Spanish is limited and I depended on the translator for his interpretation of what was said by the person being interviewed. The translator would translate what was being said at the time of the conversation, sometimes having to stop the person and tell me what was being said before continuing. Eric Mindling, my first translator had stated that the people in these small communities might be suspicious of someone recording the conversations, so I took notes as he translated. I had to rely on his interpretation for my information and he would tell me if he thought the person might be telling a story, not something that they actually experienced, or if the person was not being truthful. My second translator, Carlos Ortega Ayala, translated in the same manner, but made no comments as to the validity of the stories. The information given regarding how the production of silk affected the families, both their structure and economics was taken at face value. There was no reason to believe otherwise.

Clandinin and Connelly (2000) describe narratives as “life stories” (pg. 41) stating that the stories do not always take an expected course and the researcher should be ready for shifts and changes in the research. What may be explored may change as the research progresses. The consequence of going into the communities around the city of Oaxaca was an unknown factor. The end-view of these narratives and research was also an unknown.

Eric Mindling knew two women in San Pedro Cajonos and one woman in San Mateo Peñasco who produced silk. He was familiar with the communities, but stated that there was no way to contact these women ahead of time to know if they would be home when we arrived. He stated that we would go into the communities, ask directions, and ask about other women who were producing silk. He stated that the people were friendly and would talk to us. Standing at over six feet tall with fair skin and red hair, Eric stood out among the Zapotec people and after initial contact with one woman, other people would approach us to talk about silk.

This is a multi-site study. At the beginning of data collection, I expected to visit three communities: San Pedro Cajonos, San Miguel Cajonos, and San Mateo Peñasco. However, after spending two days in San Pedro Cajonos, we traveled to Xagacia (sag:a'si:a) before going to San Miguel Cajonos. We also added the community of Teotitlán de Valle before traveling to San Mateo Peñasco and interviewed people in the city of Oaxaca after returning from San Mateo Peñasco. Except for Teotitlán de Valle, the communities are in the mountains around the city of Oaxaca within a drive of two to three hours. Teotitlán de Valle is southeast of the city of Oaxaca; San Pedro Cajonos, San Miguel Cajonos, and Xagacia are northeast of Oaxaca; and San Pedro Peñasco is northwest of Oaxaca (see Figure 2, Appendix A). We anticipated that there would be only a few families who produce silk in each

community. A stay of 3 to 5 days in each community was projected to be sufficient to collect the data needed. However, there were many more families producing silk than expected and we interviewed as many people from different silk groups as possible. There was a need to revisit Oaxaca and the communities of San Pedro Cajonos and San Miguel Cajonos after compiling and sorting the data. Eric Mindling (personal communication, July 25, 2005) arranged places to stay, transportation, and a local interpreter for the additional visits. Appendix B is a list of the names of people interviewed. Most people gave me their full name, with some only giving a first name. All of the people interviewed wanted me to use their actual name in my writing and I have done so.

The methods used to gather data included interviews with the members of the communities and observation of their work and their community interactions. The interviews took place in the person's home, were open-ended, and began with general conversation about the family and community. The translator began with introductions, explained the research and its purpose and answered any questions the person had regarding the research and me. There were specific questions that needed to be answered; however, the conversations took their own course and their own time. Within the first two or three interviews, we found that most people were willing to talk about silk cultivation and their family history if more personal topics were also included and if there was no time limit on the conversation. A relaxed, personal conversation proved to be effective in obtaining all of the needed information, and very often food was included during the course of the dialog. This approach continued during other visits and interviews. A constructionist view was taken and the meanings of situations were construed as experienced or after examination of the data gathered. This was done through personal conversations between the translators and me.

Appendix C includes the questions that were asked of the community members who participated in raising silkworms and processing the silk as well as instructions for the translators. Included in the interviews were questions such as how long has your family been raising silk worms, and are there any stories handed down through your family concerning the beginning of this process? There were questions to determine what type of assistance has been given to the communities and if the communities have adopted these changes or if they continued using the old and unique ways of the past.

The information from the stories was verified by cross-referencing what was told to me (via the translator) by the various participants in the interviews. This method of triangulation of information is recommended by Creswell (1998) who stated that verifying factual information from multiple and different sources can "shed light on a theme or perspective" (p. 202). In addition, Hatch and Wisniewski (1995) wrote about how major issues or social-historical events can be connected with individual stories to show truthfulness to the story. Further verification of historical facts of silk cultivation and its sustainability resulted from a personal conversation with Alejandro de Ávila Blomberg, the historian and botanist in Oaxaca. There were also interviews with people working for organizations involved in the communities' production of silk. These interviews add to the multiple sources of information on the same theme. The narratives gathered were discussed with the translator at the end of each day to determine the accuracy of my interpretation of his translation. Only the speeches at the silkworm distribution site were recorded for translation at a later time.

An exemption for the signed consent document from the women and men being interviewed was been granted by Iowa State University, Office of Research Assurances,

September 20, 2006, and is included in Appendix D. This exemption was requested because Eric Mindling, my first translator, stated that the people in the communities would be suspicious of signing anything that was written in English and would possibly not understand a human subject document that was written in Spanish. He was uncertain how many of the adults we would be interviewing would be able to read Spanish. An exemption was requested to avoid any problems and both translators were instructed that they must explain the research and who I was before we started the interview. In this way, the person being interviewed was given the option to refuse to answer questions or talk to us.

There were several sampling strategies used in accordance with Creswell's (1998) types of sampling. The first strategy investigated was criterion-based in which all of the interviews were with women and men involved in the cultivation and production of silk and/ or the marketing of the products. The second strategy was the snowball or chain sampling in which the names of additional persons involved in the cultivation of silk were given to me by the person being interviewed. Another strategy was opportunistic in which I took advantage of unexpected leads that were presented during the course of the research.

Sampling for the interviews was determined by who was available on the day the translator and I were in the particular community. This was a convenience process with the only consideration being that women and/or men from different silk groups were interviewed to obtain a perspective from each group. Communication with a particular person within the communities prior to visiting the community was not always possible due to very little telephone service in the area. Interviewing one person led to the name of at least one other person involved with silk and because the communities are small, someone always knew the directions to another person's home. Even if a time and date were set to meet with a particular

person, there was no guarantee that the person would be home at the specified time. The translator stated, and we experienced, that the people within the communities work on their own time schedule, which may or may not coordinate with the established schedule.

A total of 45 people were interviewed for this study. This number was determined by the time available to spend in each community, who was available during that time, and the amount of time spent for each interview. These interviews provided an overview of the production of silk in the communities. It was determined that 45 interviews provided a large enough foundation for a good overview of silk production in the communities. Many of the interviews contain the same information with some specific information relative to a particular person or family. There are additional names of family members listed in Appendix B. They were present during the interview, but did not provide any information on silk production, only personal conversation.

Photographs were used to augment and enhance the narratives. These photographs show the people interviewed in their communities and the processes involved in raising the silkworms, spinning, weaving, and dyeing. Social events were documented when the worms were distributed to the various silk groups. These events were photographed to provide visual evidence of their significance to the production of silk. I always asked permission before taking pictures. Only one person was suspicious of my camera and did not want to have a picture taken. I complied with that request.

Analysis of the Data

The information gathered each day was put into narrative form, reviewed individually and together. Any clarification of information gathered was asked of the translator at the end

of each day, because it was not possible to verify the information with the person interviewed. My reflections and comments were written on each transcript.

I took written notes during each individual interview and later typed these notes into my computer. The notes were analyzed for content of significant information. These written narratives, which include individual stories, biographies, and histories, were, as suggested by Creswell (1998), read "in their entirety several times" becoming immersed "in the details, trying to get a sense of the interview as a whole before breaking it into parts" (p. 143). I read each narrative three, sometimes four times, rereading individual narratives when necessary for clarification. The narratives of the silk groups and individuals for each community were put into chronological order as to the date and time of the interview and analyzed and coded for themes, ideas, or relationships that occurred. Information that is consistent from person to person or information that conflicted within the group or community was taken into consideration, as recommended by Polkinghorne (1995). After the information of the individual communities was compiled, the data for all the communities as a whole were analyzed for similarities and differences among them, patterns that emerged, or obvious conflicts in the information. Polkinghorne described that concepts are to be developed at this point "rather than imposing preconceived theoretically derived concepts" (p. 13).

Because much of the information regarding the assistance given by the government to the silk groups came from outside the communities, these data were analyzed separately. This analysis included the differences and similarities between assistance to the communities and recurrent themes within communities regarding the assistance offered and received. This analysis was compiled with each community and the communities as a whole. An overall effect of the production of silk on the culture and traditions of the communities was analyzed

from this data, as were the effects on individuals, families, and communities. Areas for analysis and discussion included the meaning of any changes to the culture of the people, how it has changed their lives and their community economically and socially, and the effects of future changes in assistance from the government agencies in the way silk is spun or woven. The analysis discussed how changes made within the processes of cultivating, spinning, weaving, and dyeing the silk have now affected and may in the future affect the unique quality of the silk currently produced. An overall summary of the cultivation of silk in Oaxaca as it has perpetuated since Borah's (1943) account is included.

Themes and concepts that emerged in the analysis of the narratives are:

- Silk cultivation and its survival
- Silk community groups: their structure, interaction, and politics
- Technology and its influence on communities and silk
- Family roles and income sources
- Government and its impact on silk communities

The information gained from these themes and concepts is discussed in-depth in the next chapter. This knowledge was used to answer the questions asked in the first chapter, including the all-encompassing questions of how the families and communities have been able to change, how they have been able to embrace new technology without sacrificing their culture, and how they have adapted to economic conditions.

The photographs are used to illustrate what is termed "visual culture" by Rose (2001, p. 9), who discusses how social conditions are seen not only by the person taking the photograph, but by the person viewing the photograph. Rose goes on to state that the person viewing the photograph is never looking at just one thing and is also looking for relationships

between what is in the photograph and oneself. The photographs enhance the narratives and help the reader to gain a deeper understanding of the processes involved in cultivating and producing silk, as well as the culture of the people producing the silk.

Storage and Dissemination of Data

The narrative and visual data will be stored at Cornell University in New York in the files of the American Association of Family and Consumer Sciences (AAFCS) and will be accessible for further research purposes or reading. Besides being used as my doctoral dissertation, parts of this research will be submitted to various publications related to family, culture, and textiles. I have gathered some samples of silk cocoons and other products including spun and unspun silk and dyed and undyed yarn. My intent is to use these samples and others obtained while gathering data, in conjunction with PowerPoint slide shows, to give presentations at AAFCS conferences, local museums, or other interested groups as requested. A goal of mine is to promote understanding of this culture and how it has changed, is changing, and the meaning of these changes to the people involved. Understanding other cultures facilitates and fosters partnerships that can enhance the quality of life of the Oaxacan silk producers without sacrificing traditions.

CHAPTER 4. ANALYSIS OF NARRATIVES

Introduction

Compared to the city of Oaxaca with a population of 258,008 (Il Conteo, 2005), the communities I visited are relatively small in population. The community of San Pedro Cajonos is located east of the city and has a population of 989 people (Il Conteo, 2005). It is built on the side of a mountain with paved roads and many dirt foot paths. San Miguel Cajonos is a small community immediately before reaching San Pedro Cajonos. San Miguel Cajonos is so close to San Pedro Cajonos that the population of the two is combined; San Miguel Cajonos is not shown on the map (Figure 2, Appendix A), but is slightly west of San Pedro Cajonos. The community of Xagacia sits on the side of the mountain across the canyon from San Pedro Cajonos and has a population of 928 (Il Conteo, 2005). It is listed on the map (Figure 2, Appendix A) as Santo Domingo Xagacia. Teotitlán de Valle is in the valley south of Oaxaca and with a population of 5,601 (Il Conteo, 2005), was the largest community outside of Oaxaca I visited. San Mateo Peñasco is west of Oaxaca and has a population of 1,732 (Il Conteo, 2005).

The communities San Pedro Cajonos, San Miguel Cajonos, and Teotitlán de Valle consist of indigenous Zapotec, whose history dates back before the Spanish Conquest. Spanish is a second language for most people in these communities, with some of the older women only speaking Zapotec. Sometimes the people would speak Zapotec to each other and Spanish to the interpretor. We conducted two interviews with Reyna Martinez Cayetano translating the Zapotec into Spanish. We were told that the children learn Spanish in school, but Zapotec is their first language. Carlos, the husband of Reyna, told us that it is only in the

past couple of years that a few Mixtec or other indigenous people had been moving into the community of San Pedro Cajonos.

San Mateo Peñasco is in the Mixtec region of Oaxaca. The Mixtec also have a history dating back before the Spanish Conquest. Spanish is also their second language. One of the older women we interviewed spoke only Mixtec and her adult daughter translated her comments into Spanish and provided additional comments on silk production within the community.

The city of Oaxaca is a cultural mix of indigenous people with the dominant language being Spanish. Very few people spoke English. On the map, the actual name of the city is Oaxaca de Juarez, although I never heard anyone refer to the city by that name.

Figure 6. San Pedro Cajonos.

Eric Mindling and I began our interviews in the community of San Pedro Cajonos. As can be seen in San Pedro Cajonos (Figure 6), there is only one set of overhead power lines. All of the other power lines are low, connecting one house to another. Lidia Cruz has a satellite dish for television reception. Electrical lines connect four other homes to this dish and everyone watches the same programs. Eric and Reyna are standing on a cement street; however, the streets are not laid out in a grid pattern, they extend into various parts of the community. Most of the travel from on place to another within the community is on foot, via dirt paths. These paths are very narrow and can be very steep. They pass by vegetation as well as homes and may end at someone's home.

Eric had the names of two women from San Pedro Cajonos who produced silk; however, we found that there were many more people producing silk. After spending two days interviewing people in that community, we visited the silk group in Xagacia. We were told that this group was new to silk production. It was a difficult trip to Xagacia, because parts of the dirt road were under major reconstruction.

The day after returning to San Pedro Cajonos from Xagacia, we visited San Miguel Cajonos and Teotitlán de Valle, interviewing only a few people, and spent the night in Oaxaca. The majority of the people in Teotitlán de Valle support themselves by producing hand-dyed wool rugs or other wool products. We only interviewed one family who was involved in silk production. The next day we traveled to San Mateo Peñasco and interviewed Flor, the only name Eric had of someone producing silk in this community. She provided names of other people to interview. After interviewing people the next day, we returned to Oaxaca and interviewed several people regarding silk production.

In subsequent visits to Oaxaca, I interviewed other people producing silk in communities I had previously visited. I attended the silkworm distribution twice, where I met more people producing silk. Some of these people I was able to visit and do a more in-depth interview with them in their community on a later trip. In total, I interviewed 45 people involved in some way in the production of silk and its survival.

The following sections provide information categorized by the five themes and concepts that emerged in analyzing the narratives. Within these themes and concepts, the questions posed regarding silk production in Chapter 1 are answered. The knowledge gained from these narratives also answers the all-encompassing questions of how the families and communities have been able to change, how they have been able to embrace new technology without sacrificing their culture, and how they have adapted to economic conditions.

Silk Cultivation and its Survival

In all of the interviews, everyone remembered someone, usually an aunt, mother, or grandmother, raising silkworms, spinning, weaving, and dyeing silk. As far back as anyone could remember, silk had been produced in the communities I visited as well as other communities. Macaela Sanchez Cruz of Xagacia told us that she remembered the "grandparents" raising silkworms. The interpretor stated that the term "grandparent" referred to the older people in the community, not a relative, and was used out of respect. At the age of 98, Delfina Rosas Espinosa of San Mateo Peñasco was the oldest person I interviewed. She remembers that silk was produced in nearby communities where she grew up, but not specifically in her community. She did remember that her grandmother told her she should learn silk in order to take care of herself and not be dependent on a man. Lidia Cruz stated

that in 1994 there were only three women in San Pedro Cajonos who were still weaving. Natividad Estela Zárata Lopez, who has family in San Miguel Cajonos, stated that in that particular community there were only three or four grandmothers raising silkworms and producing silk rebozos in the 1980s.

Elena Hernandez Lorenzo of Teotitlán de Valle also remembers her mother and others in the community raising silkworms, although the primary means of income for Elena's family is now wool. Elena told how the moths would fly away after hatching from the cocoon, but that enough moths could not fly that they would lay eggs for the next batch of worms. Figure 7 shows the graine. Many women stated that they learned about silk production from a family member and began weaving at a very young age. Some women only learned part of the process and some learned later, when the government began programs to increase the production and marketing of indigenous crafts.

Figure 7. Silkworm graine on newspaper.

The older women remember how the silkworms were almost eradicated when the Mexican government began spraying the communities for malaria in 1955. The spraying continued into the 1960s. I was told that it not only killed the silkworms, but also chickens, birds, and other small animals. Everyone who told me this story also stated that there was "one women" who hid her silkworm graine and then sold the graine to others to start silk production again. In San Pedro Cajonos, the woman was supposedly from Teotitlán de Valle. In Teotitlán de Valle, it was a woman from the mountains. Upon further research, there were probably several women who lived in very remote areas of the mountains, away from the silk-producing communities whose homes were not sprayed and who were able to provide silkworms to the communities who had lost theirs from spraying. The historian, Alejandro de Ávila Blomberg, stated that each home had a number spray-painted on it when the spraying was done, so there was an accounting of all the houses within each community. Salamon in San Miguel told how the spray not only killed all of the small animals, but turned the houses and walls white. The story continues with silk production coming back from almost total eradication with these few graine being sold to the older women who were good at spinning, who kept the cycle going, and eventually increased silk production. Natividad Estela stated that for five years after the spraying there were no silkworms in any of the communities until the women who still had them began selling their graine. Stories varied about how much each egg cost, but the essence of the stories is that the sellers made an excellent profit. Several stories indicated that it took three years for silk production to recover.

There are two type of silkworms raised in the communities: the criollo and the mejorado. The criollo are the silkworms that are descendants from the graine brought into Mexico by the Spanish in the early 1500s. Many of the older women interviewed, including

Ilda Fernandez Hernandez and Otillia Masas Martinez of San Pedro Cajonos, and Delfina Rosas Espinosa and Ramona Lopez of San Mateo Peñasco, only raise the criollo silkworms and had various superstitions regarding the care of the silkworms. These superstitions included arguing in the house, illness, or camera flash on the graine will cause the silkworms to not hatch or die after hatching. There was also a spiritual significance given to how well a person cared for their silkworms. Almost all of the people raising silkworms raise the criollo worms, even though the Mexican government has a program to provide mejorado silkworms, a hybrid from Japan. When I questioned why they raised both kinds, I was told that the government is always changing and these individuals did not know how long the program providing the mejorado silkworms would continue.

According to those who raise both kinds of silkworms, the mejorado produces a larger and stronger cocoon, which provides more fiber. Lidia Cruz stated that the criollo cocoon will provide 30 meters of fiber and the mejorado cocoon 50 meters. The mejorado completes its cycle in 25 to 30 days. The cycle of the criollo silkworm is approximately 30 days. The criollo cocoons are yellow and can be very delicate to touch, whereas the mejorado produces a sturdier, white cocoon. Some of the older women prefer the criollo silkworms stating that the silk produced is much softer and the fiber is finer and they will only work with the criollo. They stated that when selling, some customers want the criollo because it is finer. Many people work with both the criollo and the mejorado. Figure 8 shows both types of silk cocoons. A slight difference in color can be seen in these boiled cocoons.

Figure 8. Mejorado (white) and criollo (yellow) cocoons.

The advantage of the criollo is that when the moths hatch from the cocoon, they lay eggs, which will then hatch and provide more silkworms. When the moths hatch out of the white mejorado cocoons, they lay eggs, but the eggs do not hatch. Lidia Cruz stated that she had three eggs hatch out the hundreds that each moth lays. The mejorado graine not hatching may be due to too wide a variation in temperature and humidity in the communities around Oaxaca compared to the controlled temperature and humidity of the building complex in San Luis Potosi, the town in northern Mexico where the graine are produced. The graine are transported to Oaxaca and hatched at a specific temperature in the distribution complex, where the silkworms grow to about one inch before being distributed to the silk groups. The criollo silkworms are acclimated to the communities, but the mejorado silkworms are not. Both kinds of silkworms eat the same amount, so many of those using the mejorado state that they have more silk fiber for the same amount of mulberry leaves eaten by the worms.

In San Miguel Cajonos, there is one person, Luis Unda, who has bred the two types of silkworms together for the past four years in order to obtain a better quality of silk and have graine that will hatch in this climate. Luis and his wife Guadalupe Cuateta do not want to be dependent on the Mexican government to provide the silkworms.

Roberta French, who speaks English, is a person living in Oaxaca who tried to introduce a silkworm from India, the Eri. This particular silkworm has five cycles each year and all of the graine will hatch. The white and turquoise silkworms rest while spinning their cocoon and produce shorter fibers, not one long fiber. She raised these silkworms for eight years and gave most of them to the women in Oaxaca to raise and spin the fibers. Unfortunately, these silkworms are prone to the disease pebrine, which wiped out the French silkworms in 1900. Roberta had a medicine from an alternative medicine woman that would control the disease. The woman sent the spray to Roberta from London, but the last batch was tied up in customs and all of the silkworms died. Roberta has not been able to import the silkworms since that time.

According to Adrian José Leyva Orozco, who was in charge of the silkworm distribution from 1996 to 2005, the cycle of the mejorado takes 25 to 30 days from graine to ready to cocoon and into a cocoon in 3 days. It can take up to 40 or 50 days if the environment is cooler. In the distribution center, they wet the floor to keep the humidity between 80-90% and put heat plates under the trays if the temperature is too cold. During the cycle, the silkworms molt four times. The first molt is three to four days after hatching. After the first molt, they silkworms are usually distributed to the communities. This is stage 2. The next molt takes place two to three days later. The third molt takes place three to four days after that and fourth molt is then four to five days later. See Figure 9. This is now stage 4. It

is then six to eight days after the fourth molt that the silkworms begin to spin their cocoons, which takes three days. When I asked how it was determined that the silkworm was molting, I was told that it stops eating. The moths are allowed to hatch from the cocoons, which takes another four to six days. The moth only lives for six days and during that time it will lay hundreds of eggs. The fiber is then spun in the manner of the shorter cotton and wool fibers after being boiled to remove the sericin.

Figure 9. Silkworms in stage 3 feeding on mulberry leaves.

In the communities of San Pedro Cajonos, San Miguel Cajonos, Xagacia, and Teotitlán de Valle, the silk fiber is spun, woven, and dyed. In the community of San Mateo Peñasco, the silk fiber is only spun and sometimes dyed, although one of the silk groups is hoping to learn to weave. In the communities where the silk yarns are woven, the end product is a rebozo. According to the stories, the silk rebozo evolved from the silk cenidor, a long

sash worn to keep a skirt tight to one's body. The cenidors were dyed a bright fuchsia with "sulfurina," a chemical dye that was purchased in Oaxaca. Rebozos and cenidors have been woven from cotton for as long as anyone could remember, but cenidors woven from silk were a sign of status. The older women told of walking to Tlacalula to sell their cenidors. When silk cenidors no longer sold well, the women began weaving wider cenidors until they became rebozos. According to Lidia Cruz, it takes eight ounces of yarn to make one rebozo. The rebozos are completed by intricate knotting of the fringe. According to Reyna Cayetano Martinez, who is 25, many of the older women do not see well enough to do the knotting and pay other women to do it for them. Reyna does beautiful knotting and stated that she and others in the group learned from someone in Yalalag, a community known for its knotting techniques. The women in Xagacia do not knot their own fringe and pay people in Tlacalula 200 pesos per rebozo for knotting the fringe on their rebozos.

In Figures 10 and 11, Reyna Cayetano Martinez is shown knotting the fringe on a rebozo. Alberto Ruiz Hernandez was one of the men I interviewed who also knots fringe. He took a class and learned to knot in eight different patterns. He can also do a double pattern of knotting in the fringe.

Figure 10. Reyna Cayetano Martinez knotting fringe on a rebozo in San Pedro Cajonos.

Figure 11. Close-up of the knotted fringe.

Silk Community Groups: Their Structure, Interaction, and Politics

Most of the communities have one or more organized silk groups as well as independent people who produce silk. Teotitlán de Valle is the only community I visited in which there were only two people producing silk. Teotitlán de Valle is know for its handwoven wool rugs, the reason Reynaldo Soza Martinez and his sister Aurora Contreras Lasso decided to begin producing silk. In addition to producing their own silk products, they interact with silk groups in San Pedro Cajonos and San Mateo Peñasco in purchasing rebozos and silk yarn.

There were a total of nine silk groups interviewed: four silk groups in San Pedro Cajonos, one in San Miguel Cajonos, one in Xagacia, and three in San Mateo Peñasco. Many independent silk producers were also interviewed. All the members in the silk group in San Miguel Cajonos are from one family. According to Natividad Estela, who is employed by Culturas Popularus to promote traditional crafts in the Cajonos area, San Pedro Cajonos had long been a trade center and people from other communities sold silk cocoons or yarn to the people in San Pedro Cajonos. The silkworms were raised in San Miguel Cajonos, Xagacia, and Xganicia (Ya:ga'nē:sēa).

Natividad began with the idea of reviving silk production after a community meeting in San Miguel Cajonos in 1985 or 1986 when she asked if the community thought silk production could become a workable income for the people and if they wanted to revive it. A group of 45 women decided to begin raising silkworms and went to the grandmothers for guidance. The silkworm graine they were given began to hatch so abundantly that more room had to be found to raise them and mulberry leaves had to be purchased from other communities to feed them. It was a very difficult task, but they had a 60-70% success rate in

producing cocoons. The group decided that they needed to plant more mulberry trees before raising more silkworms. They also had to learn what to do with the cocoons and, again, the grandmothers gave instruction. Natividad Estela then explained that the community began having problems economically and politically. People were exiled, persecuted, and land was taken away. She did not want to go into the details, but stated that this problem lasted for 10 years. People still raised silkworms in their homes, but there was no organized group during this time.

In 2006, the family group in San Miguel Cajonos had 10 members. Luis Unda, a carpenter, stated that he and his wife Guadalupe had previously been members of the group and that he had made most of their equipment. However, Luis and Guadalupe are no longer members and work independently. Natividad Estela is part of the family and works to promote the rebozos woven by the group as well as those by other groups in San Pedro Cajonos and Xagacia.

The groups in San Pedro Cajonos began as a group of 100 women when FIRCO had a competition in the 1980s for a large grant between the silk producing communities as to which one could produce 100 artisans. (FIRCO is the government agency in charge of the silkworms and mulberry trees. Eric and I could not determine the actual names for the acronym, but we thought the English translation probably was the Department of Agriculture, Forestry, and Cattle because that is the government agency that oversees the silkworm operation.) San Pedro Cajonos had students with scholarships and their mothers had to do community service as a condition of the scholarships. The president of the community required all the mothers to sign up to be artisans. The women received the grant and knew they were not artisans, but they were willing to work. The building was built beside the

middle school and trees were planted. After a break-in at the school, the president took the keys away from the silk group. He also took some of the money that was to be used on the project. The group split into several smaller groups.

This original group had 30 members in 1997. Lidia Cruz stated that in 1998 they formalized as a group and incorporated with 15 members. They lost members because, "You cannot eat a cocoon." They lost two more members when they received money to build a new building. They were told that the, "building will just belong to the village anyway, so why work so hard." Lidia says they work together as a group. If one person needs leaves to feed silkworms, another person within the group will provide them, so the leaves do not have to be purchased.

Another group in San Pedro Cajonos is Arte de Seda. Apolonio Martinez Ortega is a member of this group. The group had a total of 14 members in 2007. Felicitas Robles Martinez and her family are part of another group called Mujeres Indepiendentos that had 8 official members in 2007. I was unable to interview any members of El Rebozo de Seda even though I had the name of Lourdes Martinez Cayetano. She was not available at the times I was in San Pedro Cajonos. However, the structure of that group would probably be similar to that of the other groups. They incorporated to obtain government grants and loans to purchase equipment and pay for teachers. Members of the groups told me that it was a long process to complete all of the paperwork, but that the end result was worth the effort.

Xagacia has only one group, which had 7 members in 2006 and had been organized for four or five years. They had begun with 80 members but lost many when it came time to plant the trees. Many did not want to work that hard. Micaela Sanchez Cruz and Irma Hernandez Garcia provided most of the history and development of the group. Ernistino de

Jesus Francisco and Imelda Moreno Morales also provided information. They first began raising silkworms on the ground, but became more organized and obtained assistance from FIRCO. Natividad Estela and her sister, Esparanza Zárata Lopez, helped the group organize and obtain grants to purchase electric spinners and floor looms. They received 5,000 mulberry trees in 2005 and were able to purchase some land on which to plant them. By 2006 the trees were about three feet tall. They also have a silk shed with no electricity. They are progressing bit-by-bit, but they are very poor. Irma stated that there are many individuals in the community who still raise the criollo silkworms and sell the cocoons to San Pedro Cajonos, but that her group raises the silkworms that produce the white cocoons.

San Mateo Peñasco has three groups. Flor Batista Ortiz stated that in 1986 there was a loosely formed group of 65, but by 2006 there were only 10 in her group. They had not yet formalized the group, but were looking forward to being able to obtain teachers for weaving and dyeing. Arelia, daughter of Ramona Lopez, organized another group from some members of the first group. Ramona stated that Arelia had organized 10 of the older women in the community and was very patient with them.

Flor talked about how the original group was able to obtain looms and a building in 2003. The building and the looms were purchased by the community, not just specifically for the group, but now no one has access to the building. She would like to see the looms available for all to use. She had a loom built and keeps it in a small building she owns. She lets her group use the loom and the building. To be incorporated, the group must have a building.

The third group in San Mateo Peñasco had just received their first silkworms on May 31, 2007. The group included Maria del Carmen Espinosa and Ramon Batista and three other

persons. They planted trees three years ago, in 2004. In 2007 they had over 700 trees and recently built a small greenhouse. They spin and dye the yarn and sell it on the coast. They are looking for assistance from a government agency or other group.

Natividad Santiago, daughter of Ramona Lopez, talked about how the groups in San Mateo Peñasco cooperated with each other. If one group was not able to obtain enough silkworms for their use, then another group would obtain more and give them to the first group. The groups trusted each other in selling yarn and Flor or Arelia make arrangements to sell to people outside the community. Aurora of Teotitlán de Valle was specifically mentioned as one of the people who purchases yarn from the groups in San Mateo Peñasco.

There are also many independent people and families who raise silkworms. Some of them only use the criollo silkworm. However, to receive the mejorado silkworm from the government, each person is required to have enough mulberry trees to feed the silkworms and the person must make a profit. Incorporation is necessary only for funding purposes.

Verónica Lorenzo Quiroz who is from San Juan Colorado owns a store, lives, and works in Oaxaca. San Juan Colorado is on the coast and the climate is warm and humid. Her main focus in 2006 was the revival of naturally colored cotton. Her store sells garments that have brocade work on them using the colored cotton she has grown. She stated that she was also trying to begin silk production in San Juan Colorado. Cotton rebozos are woven and being sold very inexpensively. Verónica stated that if silk rebozos with brocade could be woven, they would sell for more money. She tried to teach brocade work to the women in San Pedro Cajonos, but she was only given one week and it cannot be taught in one week.

Verónica did have trees and some supplies, but two years ago, she divorced her husband. Because the trees were on his property, he would not give her access to them. She

was concerned about the well-being of the weavers who had been involved with the silk in San Juan Colorado. She is trying to start again and wanted to plant more trees in the spring. She stated that because of the climate, the trees grow quickly and will produce enough leaves to feed worms within one year. The silkworms also produce large cocoons in San Juan Colorado. She owns one store in Oaxaca and wants to open stores in Acapulco and Hualtuco. She stated that she does well and knows how to obtain grants and funding for the community. All of the clothing in the store is woven and sewn by the women in the community.

Technology and its Influence on Communities and Silk

Technology occurs within the silk communities in several forms: hybridized silkworms that produce more fiber, electric spinners, floor looms, and the technical process of using natural dyes. Some of the new technology has been embraced by the younger people and the people who are just learning the processes of silk production. Natividad Estela questioned, “How far do you take technology?” She noted that the communities now have electric spinners and floor looms, but that the reeler is another step. It becomes a question of continuing tradition or having a viable income. She stated, “In this case, it may be better to sustain the economy.”

It is debated by the people in the communities as to whether it is better to spin with the malacate (a hand-held and hand-operated spindle) or with an electric spinner and whether to weave on a backstrap loom or a floor loom. Each procedure has positive attributes, with spinning with the malacate and weaving with the backstrap loom being long-observed traditions. Francisca Lopez Santialla stated that she has to spin the criollo silk fibers using the malacate because the electric spinner is too fast and breaks the yarn as it is spun. Emiliano

Mendez Florez is an expert at spinning with the electric spinner and spins a very fine yarn. He stated that some people can recognize hand spinning done with a malacate.

Many of the people in these communities continue to spin the fiber by hand using a malacate. Some use a bicycle wheel as a spinning wheel and others use an electric spinner. Grants and loans from government organizations provided the money for the bicycle wheel and electric spinners. Luis Unda and Carlos, husband of Reyna Martinez Cayetano, have made electric reeling machines. They are very different in appearance and operation, but produce the same result of reeling the filament from the silk cocoons into fine yarn. In San Miguel Cajonos, the silk group has a smaller version of a large reeling machine from Japan or China. One of the groups in San Pedro Cajonos also has a reeling machine, but no electricity in the silk shed. Lidia Cruz stated that it is expensive to have a transformer installed and they need assistance from the government. All groups have access to the reeling machine at the silkworm distribution center in Oaxaca, but it is a long way to travel to reel the cocoons.

Figures 12 and 13 show the two different hand spinning methods between the communities of San Pedro Cajonos and San Mateo Peñasco. Figure 12 shows how the fibers are separated and then spun, whereas Figure 13 shows how the fibers are slightly twisted and rolled into a ball before being spun. Notice the cocoons tucked into the waist of Ramona's skirt.

Figure 12. Francisca Lopez Santialla spinning criollo fibers with a malacate.

Figure 13. Ramona Lopez pulling fiber from cocoons and rolling it into a ball before spinning in San Mateo Peñasco.

All of the people I interviewed in San Pedro Cajonos use backstrap looms to weave rebozos in a plain weave. In San Miguel Cajonos, they have received grants and loans to purchase floor looms used for weaving rebozos. The weavers are experimenting with new and more complex weaving patterns in addition to the plain weave. The group in Xagacia has two floor looms and the members take turns using them to weave rebozos. This process will produce two rebozos for each person per month. When they are not weaving, they are spinning. They also want to learn how to weave on backstrap looms. Irma Hernandez Garcia stated that the weavers in San Pedro Cajonos say the backstrap looms are better, but the weavers in San Miguel say the floor loom is better. The backstrap loom is said to have a tighter weave, whereas the floor loom has a straighter selvage. I was told it is the buyer who determines which type of weaving they want. In Teotitlán de Valle, Reynaldo Soza Martinez and his sister Aurora Contreras Lasso were the only people I interviewed who produced silk. Because they had previously woven wool rugs on floor looms, these looms were now used to weave silk.

Figures 14 and 15 illustrate the different looms. In San Pedro Cajonos, the backstrap loom is used. In San Miguel Cajonos, Xagacia, and Teotitlán de Valle, floor looms are used. The backstrap looms are being used by Lidia and Genoveva in the silk house in San Pedro Cajonos and the floor looms are shown in the building used for weaving in a complex of buildings used for silk production in San Miguel Cajonos.

Figure 14. Lidia and Genoveva weaving on backstrap looms in San Pedro Cajonos.

Figure 15. Salamon with floor looms in San Miguel Cajonos.

There is an agreement that natural dyes should be used for dyeing the silk. This is also a long-observed tradition that is being reestablished after almost disappearing, with improvements for the dyeing of silk. Fausto Contreras stated that the people sometimes need to look at the past to see how they want to proceed into the future. “Where did they come from?” What worked in the past may be the best for today and serve as a reminder of where they started.

The rebozos may be dyed or left undyed. The dyeing can take place while the silk is still in the cocoon form after being boiled to remove the sericin, after the yarn is spun, or after the rebozo is woven. The dyeing process was taught to the women in San Pedro Cajonos by three people. First was a person from FIRCO, but these dyes washed out of the rebozos. Second, was a woman from Texas who gave them much more information and better results. Third was Fausto Contreras, who gave classes in dyeing using natural dyes to many of the communities; his name was mentioned every time I asked about dyeing. Although his specialty is wool, he has adapted his techniques to silk. According to Natividad Estela, the woman from Texas provided the best information for the people in San Miguel Cajonos. The women in Xagacia had arranged for dyeing classes from Fausto at the time of the interview, but had not dyed any of their silk yet.

Figure 16 illustrates the technique of dyeing the silk cocoons before the fibers are spun. The cocoons are simmered in a pot of dye after boiling for one hour in a mordant of alum and water. The cocoons are simmered in the dye until the desired color is reached. The cocoons are then rinsed until the water runs clear. Figure 17 shows cocoons dyed with Paulo de Brasil (red) and cochineal (purple) draped over a chair, while Apolonio and one of his daughters hold a rebozo that was dyed with cochineal as a finished piece.

Figure 16. Cecelia dyeing cocoons in Paulo de Brasil (Brazilwood) in San Pedro Cajonos.

Figure 17. Apolonio Martinez Ortega and daughters with dyed rebozo and dyed cocoons on chair in San Pedro Cajonos.

In Figure 18 there are three rebozos hanging over a line at the silk shed in San Pedro Cajonos. They have been dyed by three different women. The two rebozos on the outside are dyed with natural dyes, the one on the right with Paulo de Brazil and the one on the left with Paulo de Aguila that produces a brown color, but the black rebozo in the middle was dyed with a synthetic dye. I was told by the people dyeing and Fausto that there is no natural dye, or combination of dyes, that will dye black.

Figure 18. Dyed rebozos hanging to dry in San Pedro Cajonos.

Fausto Contreras explained how the decision was made to return the natural dyes. He stated that “necessity sometimes drives us.” His father and grandfather were traditional weavers and farmers. As farming ceased to be profitable, Fausto and others in Teotitlán de Valle looked back at who they were and where they came from. The parents had lost some of the old ways. His mother raised silkworms and his father dyed the silk, but with aniline dyes.

They had to decide what kind of artisans they wanted to be. Did they want to make cheap weavings, or educate themselves? They wanted to try something different because so many weavers were using chemical dyes. They wanted to return to using natural dyes. They wanted to be independent of the outside world.

This change in technology was a process that took years. It took time to work with the grandparents and let go of the taboos that forbade sharing information and techniques. They began to cultivate food again. Fausto stated that they had good ideas, but after 500 years of being at the bottom rung and being told that is where indigenous people belong, it is believed. It took someone from the outside to validate that indigenous people have good ideas.

Family Roles and Income Sources

The involvement of family members in the production of silk changed as silk became a more viable vocation. Most families have more than one source of income and more than one family member may be involved in the production of silk. There are also people who have worked in silk, but decided it was too much work for the income and others who use silk as a supplemental income. Most of the people interviewed raised some produce for their own consumption.

Ofilia Santiago of San Mateo Peñasco told us how she used to raise silkworms, but that it was too much work. She had 500 silkworms and would feed them in the morning, go to work, and return home at 6:00 pm. The silkworms were very hungry by that time and she felt sorry for them, so she stopped raising them and now she runs her store and restaurant.

Flor Batista Ortiz depends on her silk and silver wire jewelry for her income. She makes earrings and necklaces out of silk cocoons in combination with silver wire. She took classes to learn this technique and stated that she can make more money with the jewelry. Flor knows how to spin, but she concentrates on her jewelry. Her brother raises silkworms and her mother spins. She stated that the best market for silk yarn is in Teotitlán de Valle. The price for 1 kilo of yarn was 4,000 pesos in 2006. She stated that the yarn originally was sold by the skein, but now it is sold by the kilo.

Delfina Rosas Espinosa (age 98) and Ramona Lopez (age 72) of San Mateo Peñasco, both told how they had always depended on silk for their incomes. Delfina explained that she still spun silk yarn, but not as much as she used to because it was becoming more difficult. They told how they used to walk to the coast to sell whatever silk and produce they had. The trip took them eight days over rugged trails. Delfina told how she would take over 100 skeins of yarn to the coast to sell. Her Aunt Sofia would go with them and she would take more than 100 skeins. They would walk back in large groups because they were carrying money and were afraid of being robbed. They continued to sell at the coast until 1985, but by that time they were traveling by truck. She said that now they sell to Remejio, who pays more than the people on the coast. She thought they began selling to Remejio in the 1990s. He buys only the white yarn, not dyed yarn, which saves her the cost of dyeing.

Delfina explained that they used to purchase sulfurina dye in Oaxaca for use on the yarn. They would dip the yarn into the dye and pull it out. If it was not the right color, they would dip it into the dye again. She explained that some buyers would test the yarn by licking it and wiping it on their pants. If it stained, they liked it. She began working at the age of six. She remembers grinding cochineal to use for dyes. She described how her

grandmother told her that she needed to learn to do silk and other things so she would be able to take care of herself and not be dependent on a man.

Ramona explained she used to sell yarn at the coast 20 to 30 years ago. About five years ago she began selling yarn to people in San Miguel Cajonos, San Pedro Cajonos, and Teotitlán de Valle, specifically to Aurora Contreras Lasso. Ramona's daughter Arelia is good at marketing the yarn. Ramona told how silk has always been her primary income. She and her husband have a piece of land below their house where they grow mulberry trees and Ramona raises the silkworms in her house. She began working with silk at the age of 16. Her husband, Fausto Santiago Espinosa, has always engaged in buying and selling various products. They still plant some corn, but not as much as in the past.

Ramona's daughters, Natividad Santiago and Arelia spin silk, but they also have other jobs as teachers. Silk was not their main income and only provided a supplemental income for them. Natividad also did embroidery on purses and clothing.

Luis Unda is a carpenter in San Miguel Cajonos who spends about half of his time with his carpentry and half producing silk and silk products. His wife, Guadalupe Cuateta, divides her time between the silk, raising children, and keeping house. They also grow produce for their own consumption along with increasing their quantity of mulberry trees. Luis stated that he used to be a full-time carpenter, but that the silk provided enough income for him to devote more time to breeding and raising the worms and less time to his carpentry.

The silk group in San Miguel Cajonos is comprised of all family members. Silk is their main economy. Francisca Lopez Santialla, mother of Esperanza Zárata Lopez and Natividad Estela Zárata Lopez, also runs a store. Natividad Estela lives in Oaxaca and works for Culturas Popularus and arranges for the sale of the group's rebozos. She stated that she

can sell all the rebozos the family can produce. She also sells rebozos from other groups and individuals.

Salamon Lopez of the San Miguel Cajonos family stated that the silk "does not solve their daily problems," but that in 15 to 20 days, they know there will be money. He stated that they no longer plant corn, but tend the mulberry trees and produce silk. They ask for credit from each other because they still need to eat. They no longer plant produce because the land was on a hill and it washed away. It was not worth the time.

Micaela Sanchez Cruz, Irma Hernandez Garcia, Ernestino de Jesus Francisco, and Imelda Moreno Moreles of Xagacia all have other income sources besides silk. The silk does not provide enough to support their families, but they are looking forward to a time when they only work with silk. They said they are still learning. Irma told us, "We do not know how to sell, the fear keeps us back." Natividad Estela arranges for their rebozos to be sold.

In San Pedro Cajonos, Apolonio Martinez Ortega, has three daughters and four sons who are all involved with silk. This is the main income for the family. Apolonio will also purchase rebozos from other people and resell them. They have land on which they grow produce.

Felicitas Robles Martinez and her husband Fortunato Martinez have four daughters who all have something to do with the silk. Daughter Reyna and her husband Emiliano Mendez Florez have also painted alebrijes, but could earn more money working in the fields. Reyna painted alebrijes for 14 years and taught Emiliano, who painted for 4 years. They prefer to work with silk. Emiliano also works for his uncle as a butcher.

Felicitas stated that her husband, Fortunato Martinez, grows corn and makes tortillas and tamales to sell. They grow squash and beans and sometimes raise turkeys to sell. She

said there is a combination, rebozos for money and the field for food. For awhile she wove cotton rebozos and sold them to her sister, who resold them. She used to sell to Gracelda Fernandez, who paid a good price, but Gracelda passed away. Enrique Hernandez was buying her rebozos in 2006. She was also selling rebozos to Apolonio. She only sells to people in San Pedro Cajonos. She stated that she was tired and now that her daughters were weaving rebozos, she wanted to try something new that took less silk.

Lidia Cruz depends on silk for her income. When I interviewed her in 2006, she had been able to add a room to her house with the money from silk production. She has one son and four daughters. Her oldest daughter helps with the youngest daughter so Lidia can devote more time to silk production. Her son works in the field, brings in firewood, and takes care of the donkey. Her daughters will help her with the silk, but one of her daughters will not feed the silkworms when they grow large because she is afraid they will bite her. Lidia stated that she told her daughters they could do any work they wanted to do and they like working with silk. One of her daughters also embroiders clothing.

Ilde Fernandez Hernandez and her mother, Otillia, and father, Fernando, all work in silk. They also run a restaurant in their kitchen and Otillia weaves shopping bags out of ixtle or plastica (polypropolene). They feed mostly the teachers from the nearby school. Ilde stated her family has been weaving for generations, as long as she can remember. The beater she uses with her loom was her grandmother's and is 100 years old. They built their house bit-by-bit with silk money. She sells her rebozos to people who come into the community. She said that people who have been to the community before know them. Fernando's brother also takes rebozos into the United States to sell. They purchase leaves to feed their silkworms because the road that was put through the community killed their trees. They use only the

criollo silkworms. Ilde only uses the malacate for spinning, but Fernando likes to spin with the electric spinner.

Francisca Martinez Robles works in silk using criollo cocoons. She raises the silkworms, spins the fibers, weaves, and knots the fringe. When the rebozos are selling well, her husband, Alberto Ruiz Hernandez, will also weave and do the knotting on the fringe of the rebozos, otherwise, he works elsewhere. Francisca's mother, Munaria Hernandez Pasquel, weaves shopping bags from ixtle. Their children are young and go to school and do not participate in the spinning and weaving process. Francisca will weave reeled silk for other people. She was charging 500 pesos to weave a rebozo without knotting the fringe and was starting on rebozo number 10. It takes her one week to weave a rebozo.

Reyna Martinez Cayetano works with silk and takes care of her house. Her husband, Carlos, is the only metal worker in the area and does everything from making doors and windows to sharpening axes. Reyna raises the silkworms, spins, weaves, and knots the fringe of the rebozos. She also dyes. She works with the silk every day and makes tortillas every other day. She uses an electric spinner. Carlos will sometimes weave. He stated that he has more strength and packs the yarns tighter, whereas Reyna has a looser weave that has more sheen. The difference gives the rebozo a nice texture. Reyna will also weave rebozos with reeled silk as the warp and hand spun silk as the filling.

Otillia Masas Martinez, age 75, has always depended on silk for her income. She speaks only Zapotec and her daughter, Araceli, translated the interview into Spanish. She began to spin and weave when she was 12. She stopped dyeing her rebozos when she was 40, the same time she changed from weaving cotton rebozos to weaving silk rebozos. She uses only the criollo silkworms. She can weave a rebozo in two days; Araceli can weave one in

eight days. She has a beater for her loom that is 300 years old. In August of 2007, Otillia was weaving a rebozo out of pita. She did not like the stiff yarn and the way it shrank on the loom, but it was a commissioned rebozo. She was going to weave more silk rebozos.

Sofia Reyes Morales, age 72, also depends on silk for her income. She began weaving when she was eight years old, but has only been weaving rebozos for the last 10 years. She previously wove cenidors and then scarves when the cenidors stopped selling well. She also makes net bags, rope, and purses. She sells her rebozos to a woman who resells them. Her husband used to be a rope maker, but no longer has a long enough piece of land to make rope. Her daughter lives in Oaxaca and her daughter-in-law does not want to learn to weave.

Angelica Cruz Ventura works with silk, but her husband is a mason and provides most of the family income. She purchases rebozos from other women and dyes them. Lidia and Reyna stated that Angelica is very good at spinning and dyeing, but that she does not weave. She has many family obligations and, as Lidia stated, “We cannot all do everything.”

Genoveva's husband is also a mason. Genoveva spins, weaves, and dyes rebozos. She works in the silk shed almost every day, but walks home at lunchtime to feed her son, returning to weave or dye after lunch. Lidia stated that she, Genoveva, and some of the other women work at the silk shed because there are “less distractions” than working at home.

Irma Mendez Hernandez and her husband Urbano Fernandez Chavez work with silk. Irma spins the silk using a bicycle wheel. Urbano is trying to find a market for the rebozos produced in San Pedro Cajonos. It was not specifically mentioned, but Urbano has another job that provides income.

Government and its Impact on Silk Communities

The people in San Pedro Cajonos, San Miguel Cajonos, and Xagacia state that silk production is becoming more economically feasible partly because of assistance from the government that provides the silkworms and promotes indigenous crafts throughout Oaxaca. In addition to providing silkworms, the government provides grants and loans to purchase equipment, such as electric spinners and floor looms, and pays for teachers.

In order to obtain government assistance in the form of grants and loans, a group must file the appropriate paperwork to become incorporated and be recognized as a group. Some of the groups consist only of members of one family, but others consist of several families. Usually only the women are listed as members of the group, but the men may also contribute to the production of silk.

Natividad Estela Zárata Lopez was employed by Culturas Popularus in 1978 to promote traditional crafts in her home area. She was trained in how to look for what is important within a community. She is also part of the family silk group in San Miguel Cajonos. Natividad Estela explained that by introducing smaller trees that grow faster and silkworms that form cocoons faster, the government is not trying to eradicate traditions, but improve techniques. She stated that traditions are always changing with improvements and that the introduction of new procedures is valid for any tradition. It keeps an improved version of the tradition alive. Natividad Estela stated that she did not know why there was money for the *proseda* (prosilk) project, but it was there and the emphasis was in the Cajonos area.

In 1995, representatives from FIRCO came to San Pedro Cajonos to determine the possibility of establishing a sericulture center. FIRCO sent Japanese and Korean advisors to

teach the people how to care for the silkworms. They also brought the hybridized mejorado silkworms. After raising two batches of silkworms into cocoons, Culturas Popularus provided grants so that the people could learn to spin and weave. Apolonio puts the date two years earlier. Natividad Estela puts the revival of interest in silk production as occurring in the 1970s and 1980s. According to the people in San Pedro Cajonos and San Miguel Cajonos, it was not until the 1990s that production and the sale of rebozos began to produce a more viable income for their families compared to other occupations.

Adrian José Leyva Orozco, who was head of the Centro Estatal de Sericultura (Central State of Sericulture) in Oaxaca from 1996 to 2005, explained the beginning of the silk revival in Oaxaca. He told how the Japanese and the Mexican ambassador to Japan discussed the raising of silkworms in the 1980s. Santa Maria del Rio in the state of San Luis Potosi is considered the heartland of rebozo weaving and it was decided to begin the silk project there. The weavers used cotton, rayon, and Japanese silk to weave the rebozos, but none of the communities could be convinced to raise silkworms. That is why San Luis Potosi remains the silk center and distributes the graine. Adrian would like to see a graine production center established in Oaxaca. At the distribution center in Oaxaca, they know when they need the graine to hatch to coincide with the mulberry trees producing leaves to feed the silkworms. Graine production remains in San Luis Potosi because of politics.

FAO, the United Nations Food Agriculture Organization, funded the project that took Korean experts into Vera Cruz, Puebla, and Oaxaca to set up sericulture. However, some of the money was misplaced and government interactions prevented the implementation of the program. FAO sent funds directly to FIRCO and the Korean experts work with FIRCO and

continue the program in Oaxaca. SAGAR, Secretary of Agriculture and Livestock, oversees the project in Oaxaca and San Luis Potosi.

Adrian went on to explain that between 1986 and 1990 Victor Aquino, an engineer at the Technical Institute, put together a package for the communities that included silkworms, tree starts, and a simple reeling machine. The reeling machine came with no instructions and no one knew how work it. He sold these to some of the communities, but the equipment was not used. Adrian stated that when he installed a good reeling machine in one of the communities, he would stay until the group knew how to operate the machine. The bicycle spinning wheel, which is used to spin yarn by some of the people in the communities, is also an invention of Victor Aquino.

In 1990, Victor Aquino distributed 20,000 silkworms. In 1995, 1 million silkworms were distributed. At first the graine were distributed, but then the government started to hatch the silkworms and raise them in controlled conditions for 15 days and obtained better results. If the silkworms are fed well when they are small, they produce a better cocoon. Alejandro de Ávila Blomberg stated that Victor Aquino helped make silk production more profitable by introducing a better quality cocoon from different silkworms and by introducing the bicycle spinning wheel and reeling to the communities.

Eloy Reyes Morgan, who is now in charge of silkworm distribution, explained that he and six other people at the center are in charge of the silkworm distribution. When they are not working with silkworms, they prune trees. Because they are part of the Department of Agriculture, Forestry, and Cattle, they give away many types of trees. They also reel silk one or two times a year for the silk groups. They receive small trees in April and May. There is some supervision to make sure everything is going well with the trees and the silkworms.

Felix Ortega, Director of Forestry, explained that 95-99% of the graine come to Oaxaca and that very small amounts go to the states of Puebla, Tabasco, and Vera Cruz. He explained that the other states have no silk tradition and are just beginning to raise silkworms. He realizes there is a need to have a silkworm breeding center in Oaxaca. The center in San Luis Potosi is also working on obtaining new breeds of silkworms that provide more fiber of a better quality than what is now being bred.

A statistic given by Felix Ortega is that there are now 300 families who are working in silk. His department is working with the economic sector on marketing and teaching dyeing. He stated that pricing needs to be discussed with the families producing silk products so that it is more homogeneous and that they do not price themselves out of the market.

Fausto Contreras first began teaching dyeing techniques using natural dyes on wool in 2002 to the people in Teotitlán de Valle. He then wanted to learn how to use natural dyes with silk, a process that uses different techniques with different results compared to wool. He tried to take classes in San Luis Potosi, but nothing was available. Fausto knew that his mother had woven with palm and ixtle, so he knew how to experiment with other fibers and drew from that experience. He was paid by the government to teach silk dyeing to the men and women in San Pedro Cajonos in 2002 and San Miguel Cajonos in 2003. At the time of the interview, he was going to teach classes to the women in Xagacia. He wants to help Xagacia become more independent and market for themselves. When he teaches, he tries to identify people who may be leaders and help them focus on their abilities. He tries to identify someone who may know the community dynamics and develop their skills with people who may be good at one particular part of the marketing and selling process.

The government distributes the silkworms to the communities twice a year. The first distribution is usually toward the end of March, with a second distribution in August. I attended the distribution of silkworms on March 30, 2007. Due to a problem with climate-control, all of the silkworms did not hatch and only 400,000 were available to be distributed to San Pedro Cajonos, San Miguel Cajonos, and Santo Domingo Xagacia. This was called a symbolic distribution because there were not enough silkworms to distribute to all the groups and individuals producing silk. Another distribution was planned for the end of April, but it did not take place until May 31st, because of the schedule of Lourdes Salinas Ruiz, the governor's wife, who was to be in attendance.

Juan Rodriguez Martinez, director of the sericulture center in San Luis Potosi, stated that there would be 1,400,000 silkworms distributed next time. He said that if the people who wanted to produce silk had the land, they would receive trees. Silk production is a very important project and he was concerned with marketing, supporting the silkworm cycle, and facilitating the paperwork. He is working with Lourdes Salinas Ruiz on obtaining additional funding for the project. He sees this project as self-supporting and contributing to improving the lives of the families involved in silk production.

Figure 19 shows the silkworm distribution on March 30th. The warehouse is empty except for the few silk groups who are to receive silkworms. Only the people in charge of the distribution are in attendance.

Figure 19. Silkworm distribution March 30, 2007.

On May 31, 2007, more silkworms were distributed. Because of the schedule change, the silkworms were at stage four, so they only had four more days until they started to cocoon. Eloy told us that to raise the silkworms to this point is expensive for the center and they prefer to distribute the silkworms at an earlier stage, usually stage two, after the first molt.

In attendance at this distribution were Lourdes Salinas Ruiz; Felix Ortega, the Director of Forestry; Carina Musalen, Director of Family Institution; and Concepcion Rueda Gomez, from the Institute of Arts and Crafts. There were speeches by all of the dignitaries present reiterating the importance of silk production. One box of silkworms was then handed to a representative from each group by Lourdes Salinas Ruiz. The silkworms were then distributed to all of the silk groups and some independent families. The number of silkworms

each group or family receives is dependent upon the amount of mulberry trees the group or family grows and number of people in the group. This number was written on each box of silkworms distributed. Figure 20 shows Lourdes Salinas Ruiz handing Salamon Lopez a box of silkworms.

Figure 20. Silkworm distribution May 31, 2007. Salamon Lopez is the man wearing a hat. Dignitaries in attendance from left to right: Felix Ortega, Lourdes Salinas Ruiz, Carina Musalen, and Concepcion Rueda Gomez.

Figure 21 shows the silkworm distribution on May 31, 2007. There are more people in attendance than at the previous silkworm distribution. The news media is present. Notice there are many more boxes of silkworms behind the people and rebozos for sale along the left side of the room.

Figure 21. Silkworm distribution May 31, 2007.

CHAPTER 5. CONCLUSIONS AND IMPLICATIONS

Silk production in the small communities around the city of Oaxaca is growing and changing, with some processes from the past being revived. The changes in technology are embraced more by the younger people and by those who are being introduced to silk production. The introduction and distribution by the government of the mejorado silkworm has provided larger cocoons with more fiber than the criollo silkworm, originally introduced by the Spanish and still raised by almost all of the silk producers. Because of the political instability of the government, many people want to continue raising the criollo that will lay graine that hatch and continue the cycle. The silk producers do not want to be dependent on the mejorado that is only produced in climate controlled conditions. Government spraying to eradicate malaria from 1955 to the 1960s caused a profound loss of silkworms with only those silkworms located in very remote areas surviving. The government now provides support to the communities in the form of mulberry trees, training by silk experts from Korea and Japan, and grants and loans for looms and new equipment. The people in the communities willingly accept the support from the government and the experts it sends. Communities and individuals have been proactive in terms of searching out expertise in the form of dyers, weavers, and growers. They have formed cooperatives to secure government support. They cooperate to market their products. They continue to improve the production of silk and their economic condition.

There are many individuals within the government involved in the production of silk. They concentrate their efforts in supporting the communities in the production of silk. They have worked to improve the type of silkworm produced and the quality and quantity of the silk produced in the communities. They work to obtain grants, loans, and teachers for the silk

producers. They work with the communities on marketing silk and silk products. In addition, there has been some effort in product development in the form of natural dyes and more elaborate fabrication methods. Even though the government has provided assistance, it has unfortunately, through its action, or inaction, and political instability created problems for these individuals and communities it is trying to help.

The people interviewed in the communities around the city of Oaxaca recall silk being produced for as long as they can remember. Most remember a close relative raising silkworms, spinning yarn, weaving, and/or dyeing. However, by the early 1990s, silk production was only done by a few of the older women in the communities. When the Mexican government began promoting indigenous crafts, more women began to raise silkworms and produce silk. This production was also increased when the government began providing a silkworm that produces a larger cocoon, providing more fiber than the criollo cocoon that has been used for as long as anyone remembered.

As silk production becomes more profitable, more families devote a greater amount of time to its production. Apolonio Martinez Ortega in San Pedro Cajonos has four sons and three daughters, all of whom are involved in silk production. Felicitas Robles Martinez has her family and son-in-law involved in the production of silk. Reyna Martinez Cayetano's husband Carlos spins and weaves in his spare time. Francisca Martinez Robles stated that her husband, Alberto Ruiz Hernandez, will weave and knot the rebozos when they are selling well. It is Alberto who took a class in knotting the fringe and learned eight different patterns. Luis Unda, the carpenter in San Miguel Cajonos, devoted more time to silk production as it became more profitable. For Salamon Lopez and his family group in San Miguel Cajonos, silk is their main income source. Two of the silk groups in San Mateo Peñasco had been

raising silkworms and spinning silk for some years, but the third group had just received their first silkworms. This third group was also interested in learning to weave the yarn once it is spun. The silk has previously been sold only as spun yarn.

There are also a few families where only the mother produces silk. Sofia Reyes Morales of San Pedro Cajonos, 72, has only been weaving rebozos for the past 10 years; however, she has been weaving with cotton since she was 8. Her daughter is in Oaxaca and has another job; her daughter-in-law is not interested in silk production. Her granddaughters are too young to be involved in silk. In San Mateo Peñasco, Delfina Rosas Espinosa did not talk about any of her children or grandchildren being involved in silk production. The two daughters of Ramona Lopez are teachers and only work with silk part-time. These families seemed to be the exception in silk production.

There are changes taking place in weaving and dyeing the silk. The white cocoons produce more fiber, but the criollo cocoons continue to be spun and woven into rebozos. There is new technology combining with the traditional technology. There have been improvements in techniques as well as persistence of the old techniques. Some of the changes being made are a return to far older traditions, such as dyeing with natural dyes. Other changes incorporate new technology for the communities, such as the reeling machines and the electric spinners. The floor looms have been used to weave wool since they were introduced by the Spanish, but are now being used to weave the silk, a new development. Family dynamics have adapted to the changes in the economy, with more people involved in silk while agriculture provides food for only their families. Government involvement has assisted with interest in the new technology.

Sharing this information about the silk producing communities in Oaxaca will bring attention to their unique products: silk that is raised, spun, woven, and dyed by hand. More exposure of the silk products will mean greater exposure of the communities and families producing silk, providing more marketing opportunities, and improving the economic situation of the communities and families.

However, assistance in developing international markets is needed. The Mexican government has programs to promote indigenous crafts: woven wool rugs, intricately painted carved figure, pottery, basketry, and silk. They have programs to encourage tourism. They want their craft artisans to be successful. Specific programs that promote the silk production taking place in the state of Oaxaca would also encourage tourism and success of this craft.

Further visits should be made to these communities to see how silk production continues to evolve. The production of silk is still new to many families, but is providing enough income to be a viable business. How this business continues is important to document. Does it continue to grow or does it decrease? Documenting whether the government assistance programs continue is important in its effect on the continuance of silk production. Does silk production expand to other areas or communities?

There is also an emphasis on indigenous crafts and works of art that have a unique quality. The market for these kinds of products is expanding. Will it expand enough to provide income to support the 300 families now involved in silk production? Will it expand enough to provide income for additional families?

With the Mexican government support of indigenous crafts, further research could focus on the impact of the use of natural dyes. Natural dyes are recognized as an alternative to synthetic dyes. How are natural dyes being revived or how have they continued to be used

is of interest to the textile community. How has the switch from synthetic dyes to natural dyes occurred? What plants, insects, animals (shellfish) are used? Where are these dyes grown and who grows them? What chemicals, if any, are used in the dyeing process and who provides them? What is the environmental impact of using natural dyes? Is there someone who only dyes fibers? Some of the natural dyes currently being used (indigo, cochineal, murex [Purpura pansa shellfish]) might be of specific interest to certain markets. What is the process of dyeing with indigo? How is cochineal raised and processed? How is the purple dye obtained from the Purpura shellfish?

Additional research might focus on some of the other fibers that are produced and processed: ixtle, pita, and agave. These fibers could be considered an alternative to synthetic fibers. How they are being produced, processed, and used could be of interest to the textile community. Where are the plants grown and who grows them? What is the environmental impact of using these natural fibers? How do products made from these fibers perform? Can these fibers be dyed with natural or synthetic dyes? What kinds of products would be appropriate end uses for these fibers?

From my perspective, this was a very interesting study. I went into the communities not knowing what to expect and returned home with a respect for the people in the small communities. The culture is very different from the United States. Life has a slower pace, except for driving. Eric Mindling said that the fastest time in Oaxaca is “between when the traffic light turns green and the first person honks the horn.”

We never knew where we were going to spend the night, but it aways worked out. Reyna's uncle had an empty house and Francisca and Alberto had a neighbor with an empty room. I paid Reyna for the use of the house and for feeding us, but the neighbor of Francisca

and Alberto would not take any money. The meals were simple. If we ate at a restaurant, the interpreter would ask what was being served and we usually had two choices, both came with freshly made torrillas. When Lidia asked us over to her house one evening, we were served coffee (weak and sweet) and sweet breads to dip in the coffee.

The homes were sometimes only one small room, with the bathroom outside. Many of the homes had more than one building. Most days we were outside. Most of the people seemed to spend their time weaving and spinning outside. Even on the day it was raining, we were outside under what would be described as a room with only a ceiling. A tarp had been put up to keep the rain off the weaving. In the evening, we were inside a room in someone's home.

During the day, everyone in the communities was working. When we would interview someone, they would spin or weave, or in the case of Ramona Lopez, her husband sat and scraped dried corn off the cob while she and her daughter talked to us. A friend also came by and sat with us and braided palm leaf hats. My perception was that everyone had a good work ethic. No one blamed the government for anything. Everyone was aware that the Mexican government was unstable and subject to change and the people would keep working. They were very willing to discuss the politics of their particular community.

I felt very comfortable and welcome in the communities, even though my Spanish is very limited. The people I interviewed were very open and willing to share information regarding the production of silk and their lives. Emiliano had me spinning with the electric spinner. They also wanted to know about me and my family, when I would return. Many conversations were on a personal level. I would definitely like to return and continue to document silk production by the individuals and groups I interviewed in these communities.

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APPENDIX A

FIGURES 1-5

Figure 1. Map of Mexico.

Map Legend for Figure 1.

1. Aquascalientes
2. Baja California
3. Baja California Sur
4. Campeche
5. Chiapas
6. Chihuahua
7. Coahuila
8. Colima
9. Durango
10. Guanajuato
11. Guerrero
12. Hildago
13. Jalisco
14. México
15. Michoacán
16. Morelas
17. Nayarit
18. Nuevo León
19. **Oaxaca**
20. Puebla
21. Querétaro
22. Quintana Roo
23. **San Luis Potosí**
24. Sinaloa
25. Sonora
26. Tabasco
27. Tamaulipas
28. Tlaxcala
29. Veracruz
30. Yucatán
31. Zacatecas


OAXACA
DE JUAREZ
Santa Lucia
del Camino
Santa Cruz Xoxocotlan
Zimatlan
de Alvarez
Ocotlan
de Morelos
Tlacolula
de Matamoros
Santiago
Matatlan
Miahuatlan
de Porfirio Diaz
Santa Maria
Huatulco
Pochutla
Puerto
Escondido
Puerto
Angel
Salina
Cruz
Juchitan
de Zaragoza
Tehuantepec
Santo Domingo
Tehuantepec
Ejutla
de Crespo
Nochixtlan
Huajuapan
de Leon
Tlaxiaco
Putla
Villa
Alta
Mixe
Mixteca
Valles
Centrales
Istmo
Costa
Sierra
Norte
Sierra
Sur
Papaloapan
Cuenca
del Rio
Verde
Cuenca
del Rio
Tehuantepec
Cuenca
del Rio
Atoyac
Cuenca
del Rio
Tlapacoyan
Cuenca
del Rio
Papaloapan
Cuenca
del Rio
Coatzacoalcos
Cuenca
del Rio
Grijalva
Cuenca
del Rio
Usumacinta
Cuenca
del Rio
Grijalva
Cuenca
del Rio
Coatzacoalcos
Cuenca
del Rio
Papaloapan
Cuenca
del Rio
Tlapacoyan
Cuenca
del Rio
Atoyac
Cuenca
del Rio
Tehuantepec
Cuenca
del Rio
Verde

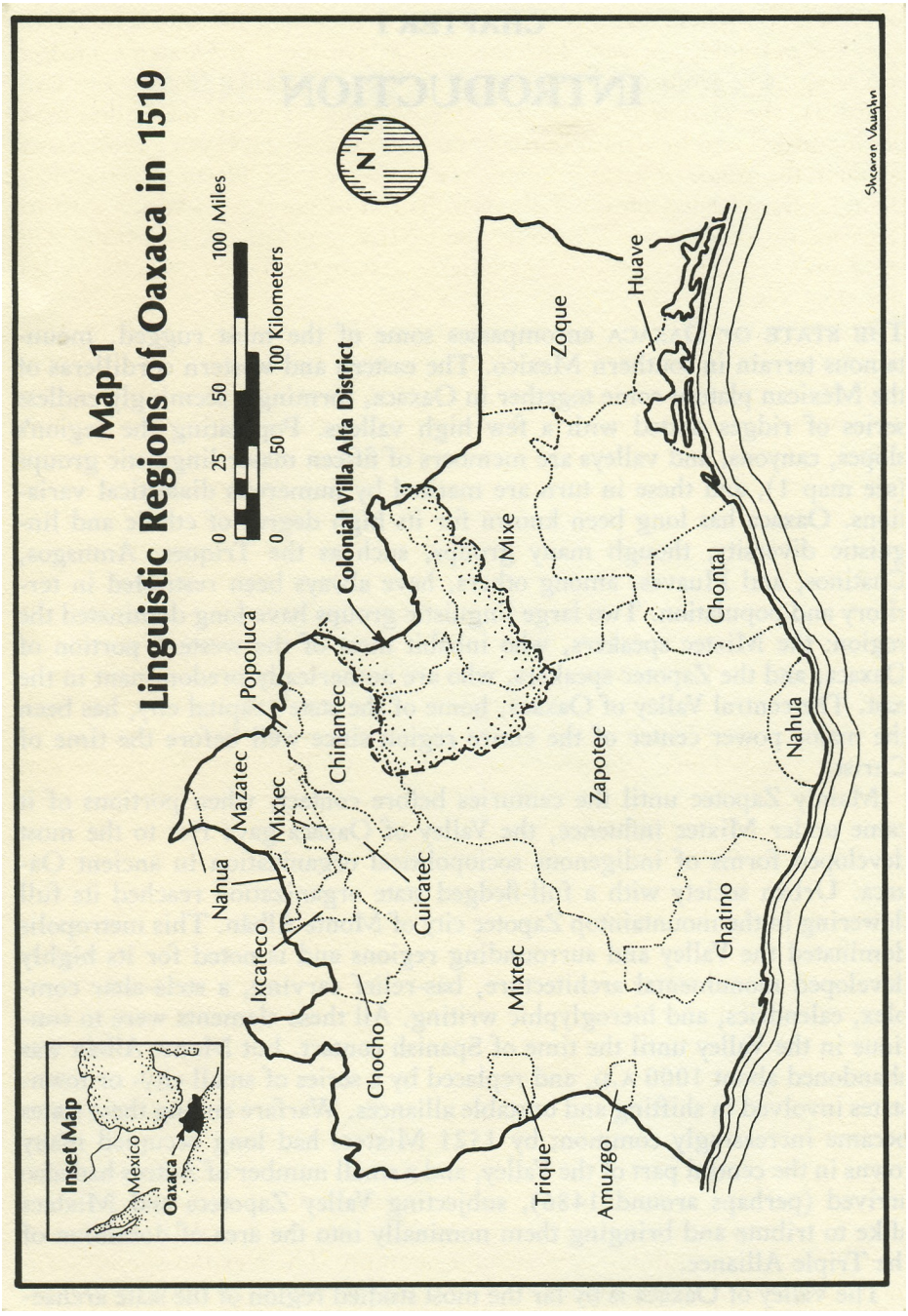

Figure 3. Linguistic Regions of Oaxaca in 1519 (Chance, 1989).

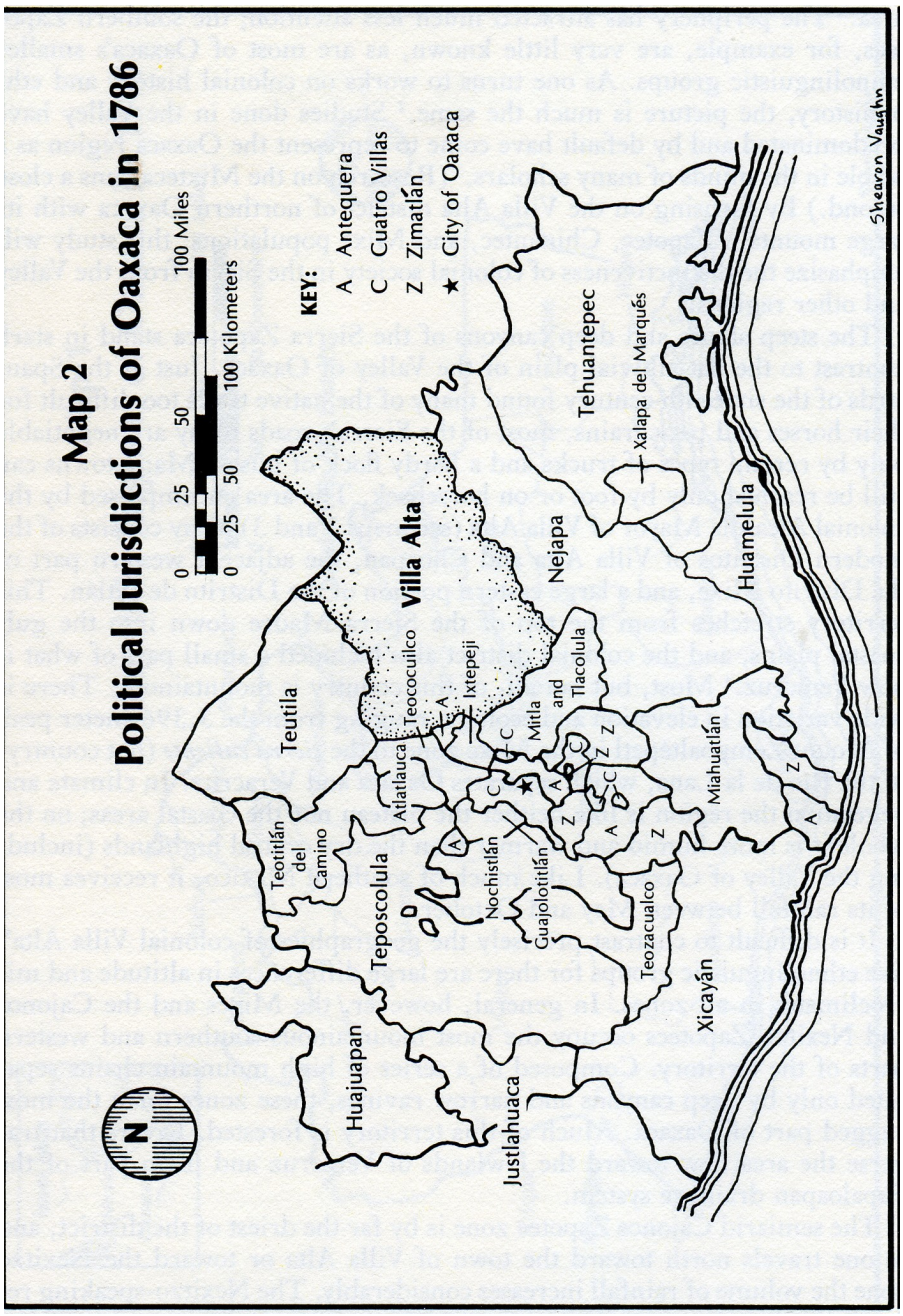

Figure 4. Political Jurisdiction of Oaxaca in 1786 (Chance, 1989).

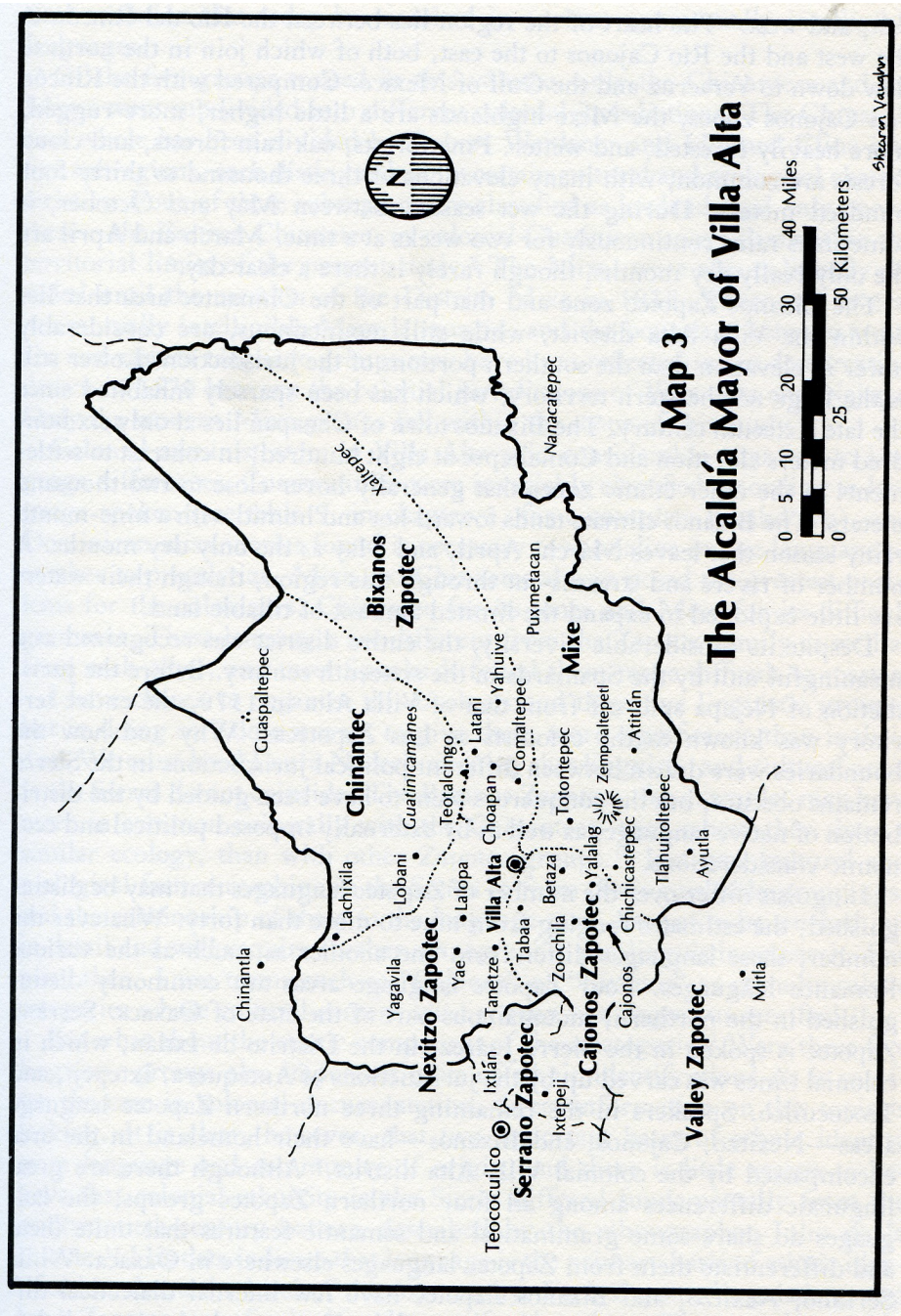

Figure 5. The Alcaldía Mayor of Villa Alta (Chance, 1989).

APPENDIX B

NAMES OF PEOPLE INTERVIEWED BY COMMUNITY

This appendix lists the names of the people interviewed and the communities in which they were interviewed. Ages, when given, are listed in parentheses after the name.. Familial relationships are also listed.

San Pedro Cajonos
November 6-8, 2006
August 23-24, 2007

Ilde Fernandez Jimenez
Fernando Juarez – father of Ilde
Otillia – mother of Ilde

Lydia Cruz Mendez

Genoveva Martinez Hernandez

Reyna Martinez Cayetano (25)
Carlos – husband (28)

Otillia Masas Martinez (75)
Araceli Velasco – daughter

Sofia Reyes Morelas (72)

Irene Chavez

Angelica Cruz Ventura
Carlos Batista – son

Irma Mendez Hernandez
Urbano Fernandez Chavez – husband

Apolonio Martinez Ortega

Francisca Martinez Robles
Alberto Ruiz Hernandez – husband

Felicitas **Robles Martinez**
Fortunato Martinez – husband
Maria de Carmen Martinez – daughter
Cecilia – daughter
Emiliano Mendez Flores husband to Cecilia

Xagacia
November 9, 2006

Micaela Sanchez Cruz

Ernistino de Jesus Francisco

Irma Hernandez Garcia (46)

Imelda Moreno Morales

San Miguel Cajonos
November 9, 2006
August 23, 2007

Esperanza Zárata Lopez
Francisca Lopez Santialla – mother
Salamon Lopez – uncle

Luis Unda
Guadalupe Cuateta – wife

Teotitlán de Valle
November 9, 2006
November 15, 2006

Elena Hernandez Lorenzo

Reynaldo Souza Martinez
Aurora Contreras Lasso – sister

Fausto Contreras
Estella – sister

Oaxaca
November 10, 2006
November 14-16, 2006

Natividad Estela Zárata Lopez – sister of Esperanza in San Miguel Cajonos

Adrian Leyva

Verónica Lorenzo Quiroz

March 30, 2007

Eloy Reyes Morgan

Roberta French

May 31, 2007

Concepcion Rueda Gomez

Felix Ortega

Alejandro de Ávila Blomberg

San Mateo Peñasco
November 11-12, 2006

Flor Batista Ortiz

Ofilia Santiago

Ramona Lopez
Natividad Santiago – daughter

Delfina Rosas Espinosa (98)
Daniel Batista Rojas – son
Felencia Bautista Hernandez – not interviewed about silk, but the interviews occurred in her house and she contributed comments during the interviews

Maria del Carmen Espinosa
Ramon Batista
(Interviewed in Oaxaca on May 31, 2007, they are part of the third group in the community)

APPENDIX C

INSTRUCTIONS TO INTERPRETERS

AND

INTERVIEW QUESTIONS

INSTRUCTIONS TO INTERPRETERS

I used two interpreters, Eric Mindling and Carlos Ortega Ayala, but only one of the two accompanied me on each visit. Each interpreter would introduce himself and tell who he was, and then he would introduce me. The interpreter would tell the person my name, that I was from California, that I was working on my doctorate at Iowa State University, and that it involved research on silkworms and silk production in Oaxaca. He would then ask the person being interviewed if he or she had any questions for me. The interview would then commence. At times, the conversations would begin with the interpreter asking where we could find a specific person, which may or may not have led to more information on silk production. Many times we would exchange casual conversation before actually seeking answers to the interview questions.

The questions listed below are what I gave to the interpreters as a guideline to ask the people we interviewed. With very little prompting from the interpreter, the respondents would elaborate on their answers and provide stories about the history of silk production within the community along with stories of family history and the production of silk. We were told about the politics involved regarding silk production as well as general politics within the community. Stories included the viewpoint of the respondents regarding the government assistance that was offered and the general opinion of the government. The conversations were very open-ended and we were given interesting stories and more information than was needed to answer the questions originally asked in this study.

INTERVIEW QUESTIONS

1. How long have you been involved in the production of silk?
2. How long have you been spinning, weaving, and/or dyeing? Do you do one or all?
3. Did your mother or grandmothers produce silk?
4. Who else in your family is involved in the production of silk?
5. What other activities provide income for your family?
6. What assistance has the government or other people provided to help you?

APPENDIX D

HUMAN SUBJECTS FORM AND APPROVAL

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office of Research Assurances
Vice Provost for Research
1138 Pearson Hall
Ames, Iowa 50011-2207
515 294-4566
FAX 515 294-4267

DATE: September 14, 2006

TO: Careyn P. Armitage
840 E. Peralta Way, Fresno, CA 93704

CC: Dr. Yvonne S. Gentzler
30A MacKay Hall

FROM: Jan Canny, IRB Administrator
Office of Research Assurances

SUBJECT: IRB ID 06-~~377~~ 393 1/16/07 **Study Review Date:** 13 September 2006

The Institutional Review Board (IRB) Chair has reviewed the project, "Silk Production in Villages of the Oaxaca are of Mexico", IRB ID 06-393 and has declared the study exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b) (2). The applicable exemption category is provided below for your information. Please note that you must submit all research involving human participants for review by the IRB. Only the IRB may make the determination of exemption, even if you conduct a study in the future that is exactly like this study.

The IRB determination of exemption means that this project does not need to meet the requirements from the Department of Health and Human Service (DHHS) regulations for the protection of human subjects, unless required by the IRB. We do, however, urge you to protect the rights of your participants in the same ways that you would if the project was required to follow the regulations. This includes providing relevant information about the research to the participants.

Because your project is exempt, you do not need to submit an application for continuing review. However, you must carry out the research as proposed in the IRB application, including obtaining and documenting (signed) informed consent if you have stated in your application that you will do so or if required by the IRB.

Any modification of this research should be submitted to the IRB on a Continuation and/or Modification form, prior to making any changes, to determine if the project still meets the Federal criteria for exemption. If it is determined that exemption is no longer warranted, then an IRB proposal will need to be submitted and approved before proceeding with data collection.

Exempt Categories

(2)Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

IRB

For IRB Use Only			
	Review Date: _____	IRB ID: 06-393	AUG 22 2006
	Approval Date: _____	Length of Approval: _____	
	Approval Expiration Date: _____	FULL Committee Review: _____	
	EXEMPT per 45 CFR 46.101(b): 2 Date: 13 Sept 06	Minimal Risk: ✓	
	EXPEDITED per 45 CFR 46.110(b) _____	More than Minimal Risk: _____	
	Category _____, Letter _____	Project Closed Date: _____	

ISU NEW HUMAN SUBJECTS REVIEW FORM

ORIGINAL

SECTION I: GENERAL INFORMATION

Principal Investigator (PI): Careyn P. Armitage		Phone: 559-259-6494	Fax: 559-237-7960
Degrees: BA; MS	Correspondence Address: 840 E. Peralta Way Fresno, CA 93704		
Department: FCSED		Email Address: cpa@iastate.edu	
Center/Institute:		College: ISU	
PI Level: ☐ Faculty ☐ Staff ☐ Postdoctoral ☒ Graduate Student ☐ Undergraduate Student			

Title of Project: Silk production in villages of the Oaxaca area of Mexico
Project Period (Include Start and End Date): [*mm/dd/yy*][*10/02/06*] to [*mm/yy/dd*][*12/31/08*]

FOR STUDENT PROJECTS	
Name of Major Professor/Supervising Faculty: Dr. Yvonne S. Gentzler	Signature of Major Professor/Supervising Faculty: Yvonne S. Gentzler
Phone: 515-294-0533	Campus Address: 30A MacKay Hall
Department: FCSED	Email Address: gentzler@iastate.edu
Type of Project: (check all that apply) ☐ Research ☐ Thesis ☒ Dissertation ☐ Class project ☐ Independent Study (490, 590, Honors project) ☐ Other. Please specify: _____	

KEY PERSONNEL

List all members and relevant experience of the project personnel. This information is intended to inform the committee of the training and background related to the specific procedures that the each person will perform on the project.

NAME & DEGREE(S)	SPECIFIC DUTIES ON PROJECT	TRAINING & EXPERIENCE RELATED TO PROCEDURES PERFORMED, DATE OF TRAINING
Careyn P. Armitage, MS	PI	10/23/2005 ✓
Yvonne S. Gentzler, PhD	Major Professor	07/22/2000 ✓

Add New Row

FUNDING INFORMATION

Internally funded, please provide account number:
Externally funded, please provide funding source and account number:
Funding is pending please provide OSPA Record ID on GoldSheet:

Title on GoldSheet if Different Than Above:
Other: *e.g., funding will be applied for later.*

SCIENTIFIC REVIEW

Although the assurance committees are not intended to conduct peer review of research proposals, the federal regulations include language such as "consistent with sound research design," "rationale for involving animals or humans" and "scientifically valuable research," which requires that the committees consider in their review the general scientific relevance of a research study. Proposals that do not meet these basic tests are not justifiable and cannot be approved. If an assurance review committee(s) has concerns about the scientific merit of a project and the project was not competitively funded by peer review or was funded by corporate sponsors, the project may be referred to a scientific review committee. The scientific review committee will be ad hoc and will consist of your ISU peers and outside experts as needed. If this situation arises, the PI will be contacted and given the option of agreeing that a consultant may be contacted or withdrawing the proposal from consideration.

☐ Yes ☒ No Has or will this project receive peer review?

If the answer is "yes," please indicate who did or will conduct the review:

If a review was conducted, please indicate the outcome of the review:

NOTE: RESPONSE CELLS WILL EXPAND AS YOU TYPE AND PROVIDE SUFFICIENT SPACE FOR YOUR RESPONSE.

COLLECTION OR RECEIPT OF SAMPLES

Will you be: (Please check all the apply.)

☐ Yes ☒ No Receiving samples from outside of ISU? See examples below.
☐ Yes ☒ No Sending samples outside of ISU? See examples below.

Examples include: genetically modified organisms, body fluids, tissue samples, blood samples, pathogens.

If you will be receiving samples from or sending samples outside of ISU, please identify the name of the outside organization(s) and the identity of the samples you will be sending or receiving outside of ISU:

Please note that some samples may require a USDA Animal Plant Health Inspection Service (APHIS) permit, a USPHS Centers for Disease Control and Prevention (CDC) Import Permit for Etiologic Agents, a Registration for Select Agents, High Consequence Livestock Pathogens and Toxins or Listed Plant Pathogens, or a Material Transfer Agreement (MTA) (http://www.ehs.iastate.edu/bs/shipping.htm).

SECTION II: APPLICATION FOR INSTITUTIONAL REVIEW BOARD (IRB) APPROVAL

☐ Yes ☒ No Does this project involve human research participants? If the answer "no" is checked, you will automatically moves to a question regarding the involvement of radiation producing devices in your project.

SECTION III: ENVIRONMENTAL HEALTH AND SAFETY INFORMATION (EH&S)

☐ Yes ☒ No Does this project involve laboratory chemicals, human cell lines or tissue culture (primary OR immortalized), or human blood components, body fluid or tissues? If the answer is "no" is checked you will automatically move to a question regarding the involvement of human research participants in your project.

ASSURANCE

- I certify that the information provided in this application is complete and accurate and consistent with any proposal(s) submitted to external funding agencies.
- I agree to provide proper surveillance of this project to ensure that the rights and welfare of the human subject or welfare of animal subjects are protected. I will report any problems to the appropriate assurance review committee(s).
- I agree that I will not begin this project until receipt of official approval from all appropriate committee(s).
- I agree that modifications to the originally approved project will not take place without prior review and approval by the appropriate committee(s), and that all activities will be performed in accordance with all applicable federal, state, local and Iowa State University policies.

CONFLICT OF INTEREST

A conflict of interest can be defined as a set of conditions in which an investigator's or key personnel's judgment regarding a project (including human or animal subject welfare, integrity of the research) may be influenced by a secondary interest (e.g., the proposed project and/or a relationship with the sponsor). ISU's Conflict of Interest Policy requires that investigators and key personnel disclose any significant financial interests or relationships that may present an actual or potential conflict of interest. By signing this form below, you are certifying that all members of the research team, including yourself, have read and understand ISU's Conflict of Interest policy as addressed by the ISU Faculty Handbook (http://www.provost.iastate.edu/faculty .) and have made all required disclosures.

☐ Yes ☒ No Do you or any member of your research team have an actual or potential conflict of interest?
☐ Yes ☐ No If yes, have the appropriate disclosure form(s) been completed?

SIGNATURES

7-28-06
Signature of Principal Investigator Date

8/8/06
Signature of Department Chair Date

PLEASE NOTE: Any changes to an approved protocol must be submitted to the appropriate committee(s) before the changes may be implemented.

Please proceed to SECTION II.

SECTION II: IRB SECTION - STUDY SPECIFIC INFORMATION

STUDY OBJECTIVES

Briefly explain in **language understandable to a layperson** the specific aim(s) of the study.

The purpose of this study is to determine if there are existing families in the Oaxaca area of Mexico who still produce silk from the silkworms introduced by Cortez in the 1500s. If so, how and why have the families sustained this production? If not, what has encouraged the family to currently engage in silk production?

BENEFIT

Explain in **language understandable to a layperson** how the information gained in this study will benefit participants or the advancement of knowledge, and/or serve the good of society.

The advancement of knowledge will be in the area of existing silk production, the relation of silk production to the family's economy, and understanding of silk production within the family structure. There will be an advancement of knowledge in how this industry is taught and passed from generation to generation.

PART A: PROJECT INVOLVEMENT

1) ☐ Yes ☒ No Is this project part of a Training, Center, Program Project Grant?
   Director Name: Overall IRB ID:
2) ☐ Yes ☒ No Is the purpose of this project to develop survey instruments?
3) ☐ Yes ☒ No Does this project involve an investigational new drug (IND)? Number:
4) ☐ Yes ☒ No Does this project involve an investigational device exemption (IDE)? Number:
5) ☐ Yes ☒ No Does this project involve existing data or records?
6) ☐ Yes ☒ No Does this project involve secondary analysis?
7) ☐ Yes ☒ No Does this project involve pathology or diagnostic specimens?
8) ☐ Yes ☒ No Does this project require approval from another institution? Please attach letters of approval.
9) ☐ Yes ☒ No Does this project involve DEXA/CT scans or X-rays?

PART B: MEDICAL HEALTH INFORMATION OR RECORDS

1) ☐ Yes ☒ No Does your project require the use of a health care provider's records concerning past, present, or future physical, dental, or mental health information about a subject? The Health Insurance Portability and Accountability Act established the conditions under which protected health information may be used or disclosed for research purposes. If your project will involve the use of any past or present clinical information about someone, or if you will add clinical information to someone's treatment record (electronic or paper) during the study you must complete and submit the Application for Use of Protected Health Information.

PART C: ANTICIPATED ENROLLMENT

Estimated number of subjects *contacted* to reach required enrollment: 50 or less

Number of subjects to be enrolled in the study Total: 40 or less Males: 10 Females: 30	
Check if any enrolled subjects are: ☐ Minors (Under 18) Age Range of Minors: ☐ Pregnant Women/Fetuses ☐ Cognitively Impaired ☐ Prisoners	Check below if this project involves either: ☒ Adults, non-students ☐ Minor ISU students ☐ ISU students 18 and older ☐ Other (explain)
List estimated percent of the anticipated enrollment that will be minorities *if known*:	
American Indian:	Alaskan Native:
Asian or Pacific Islander:	Black or African American:
Latino or Hispanic: 100%	

PART D: SUBJECT SELECTION

Please use additional space as necessary to adequately answer each question.

11. Explain the procedures for selecting subjects including any inclusion/exclusion criteria (*i.e., Where will the names come from? Will a sample be purchased, will ads, fliers, word of mouth, email list, etc. be used?).*

The researcher will be visiting two villages, San Pedro and San Miguel. The participants in this study will include only those families or family members who are raising silkworms, spinning, and/or weaving silk in the Oaxaca area of Mexico. Of particular interest are families who have been raising silkworms that were introduced in the 1500s by Spain.

12. Attach a copy of any recruitment telephone scripts or materials such as ad, fliers, e-mail messages, etc. Recruitment material must include a statement of the voluntary and confidential nature of the research. Do not include the amount of compensation, (e.g., compensation available).

Note: Please answer each question. If the question does not pertain to this study, please type not applicable (N/A).

PART E: RESEARCH PLAN

Include sufficient detail for IRB review of this project independent of the grant, protocol, or other documents.

13. Describe the flow of events used in this research protocol. Include information from the first contact with the volunteers to the end of the study. Use a diagram or flow chart if appropriate. Also, include a description of the study procedures or tasks that participants will be exposed to or asked to complete. This information is intended to inform the committee of the procedures used in the study and their potential risk. Please do not respond with "see attached" or "not applicable."

The researcher will first identify and secure the assistance of an interpreter and guide. The purpose of this study is to determine if there are potential participants in the Oaxaca area of Mexico who are willing to paticipate in a more indepth study investigating silk production, its history, and its relationship to the family. Upon the approval of potential participants to be involved in a more detailed study, the researcher will return with more precise questions related to the family's involvement in silk production, how it relates to the family's economy, and how long the family has been producing silk. If verbal agreement is given, the researcher will take photographs of the family or family members and existing practices in silk production. The researcher will be respectful of the participants desires and willingness to be involved. Photographs of children (alone) will not be included in the research, unless they happen to be involved/included

14. For studies involving pathology/diagnostic specimens, indicate whether specimens will be collected prospectively and/or already exist "on the shelf" at the time of submission of this review form. If prospective, describe specimen

 in a picture of the family at work. per email from investigator dated 30 Aug 06 OK+

procurement procedures; indicate whether any additional medical information about the subject is being gathered, and whether specimens are linked at any time by code number to the subject's identity. If this question is not applicable, please type N/A in the response cell.

N/A

15. For studies involving deception, please justify the deception and indicate the debriefing procedure, including the timing and information to be presented to subjects. If this question is not applicable, please type N/A in the response cell.

N/A

PART F: CONSENT PROCESS

16. Describe the consent process for participants who are age 18 and older. *If the consent process does not include documented consent, a waiver of documentation of consent must be requested.*

The potential participants in this study do not speak, understand, or read English. It is possible that most of the participants to be interviewed also do not write or read Spanish and would be suspicious of having to sign any documents. The villages in which they live are primative. Therefore, in order to conduct this study, I request a waiver of documentation of consent be issued.

17. If your study involves minors, please explain how parental consent will be obtained prior to enrollment of the minor(s). dated 30 August 2006 DKA

~~If minors are involved in the production of the silk, the researcher will verbally ask the parent or guardian for permission to interview the minor.~~ Minors will not be asked to participate in the research and will not be asked interview questions per email from investigator

18. Please explain how assent will be obtained from minors (younger than 18 years of age), prior to their enrollment. Also, please explain if the assent process will be documented (*e.g., a simplified version of the consent form, combined with the parental informed consent document).* According to the federal regulations assent "...means a child's affirmative agreement to participate in research. Mere failure to object should not, absent affirmative agreement, be construed as assent."

~~The researcher will ask the minor if he/she would be willing to answer some questions related to his/her involvement with silk production. If assent is given, the researcher will then ask some introductory questions to see if the minor will participate. If the minor does not answer these questions, the researcher will not ask any further questions.~~

PART G: DATA ANALYSIS minors will not be included per 30 August 2006 email. DKA

19. Describe how the data will be analyzed (*e.g. statistical methodology, statistical evaluation, statistical measures used to evaluate results*)

Qualitative methodology including visual and narrative analysis will be used to analyze the data.

20. If applicable, please indicate the anticipated date that identifiers will be removed from completed survey instruments and/or audio or visual tapes will be erased:

_____ Month/Day/Year

PART H: BENEFITS

21. Describe the benefit to the volunteer from participating in this study, *if any,* and the benefit to society that will be gained from the study. Please note that monetary compensation is not considered a benefit.

There are no preceived benefits from participating in this study.

PART I: RISKS

The concept of risk goes beyond physical risk and includes risks to subjects' dignity and self-respect as well as psychological, emotional, legal, social or financial risk.

22. ☐ Yes ☒ No Is the ***probability*** of the harm or discomfort anticipated in the proposed research greater than that encountered ordinarily in daily life or during the performance of routine physical or psychological examinations or tests?

23. ☐ Yes ☒ No Is the ***magnitude*** of the harm or discomfort greater than that encountered ordinarily in daily life, or during the performance of routine physical or psychological examinations or tests?

24. Describe any risks or discomforts to the subjects and how they will be minimized and precautions taken. Do ***not*** respond with N/A. If you believe that there will not be risk or discomfort to subjects you must explain why.

If a subject is uncomfortable talking to the researcher and the interpreter, the researcher will not pursue questioning this person.

25. If this study involves vulnerable populations, including minors, pregnant women, prisoners, educationally or economically disadvantaged, what additional protections will be provided to minimize risks?

The researcher will only be interviewing people, including ~~minors~~ and possibly pregnant women if they are willing to share the stories of their silk production. If they do not want to participate, the researcher will not interview them.

minors will not be included in the research per investigator email dated 30 August 2006. OKA

PART J: COMPENSATION

26. ☐ Yes ☒ No Will subjects receive compensation for their participation? If yes, please explain.

Do not make the payment an inducement, only a compensation for expenses and inconvenience. If a person is to receive money or another token of appreciation for their participation, explain when it will be given and any conditions of full or partial payment. (E.g., volunteers will receive $5.00 for each of the five visits in the study or a total of $25.00 if he/she completes the study. If a participant withdraws from participation, they will receive $5.00 for each of the visits completed.) It is considered undue influence to make completion of the study the basis for compensation.

PART K: CONFIDENTIALITY

27. Describe below the methods that will be used to ensure the confidentiality of data obtained. For example,, who has access to the data, where the data will be stored, security measures for web-based surveys and computer storage, how

long data (specimens) will be retained, etc.)

The data will be maintained on disks, USB mass storage devices (jump drives), and CDs for historical purposes. Due to the uniqueness of the research and its contribution to the community, the data will be made available to the Family and Consumer Sciences archival database at Cornell University. Original photographs will be maintained and published for historical purposes.

PART L: REGISTRY PROJECTS

To be considered a registry: (1) the individuals must have a common condition or demonstrate common responses to questions; (2) the individuals in the registry might be contacted in the future; and (3) the names/data of the individuals in the registry might be used by investigators other than the one maintaining the registry.

☐ Yes ☒ No Does this project establish a registry?

If "yes," please provide the registry name below.

Checklist for Attachments

The following are attached (please check ones that are applicable):

☐ A copy of the informed consent document **OR** ☐ Letter of introduction to subjects containing the elements of consent
☐ A copy of the assent form if minors will be enrolled
☐ Letter of approval from cooperating organizations or institutions allowing you to conduct research at their facility
☐ Data-gathering instruments (including surveys)
☐ Recruitment fliers, phone scripts, or any other documents or materials the subjects will see

Two sets of materials should be submitted for each project – the original signed copy of the application form and one copy and two sets of accompanying materials. **Federal regulations require that one copy of the grant application or proposal be submitted for comparison with the application for approval.**

FOR IRB USE ONLY:

Initial action by the Institutional Review Board (IRB):

☐ Project approved. Date: _____
☐ Pending further review. Date: _____
☐ Project not approved. Date: _____

Follow-up action by the IRB:

Marie K. Ament
IRB Approval Signature

19 September 2006
Date

SECTION III: ENVIRONMENTAL HEALTH AND SAFETY INFORMATION

☐ Yes ☒ No Does this project involve human cell or tissue cultures (primary OR immortalized), or human blood components, body fluids or tissues? If the answer is "no", please proceed to SECTION III: APPLICATION FOR IRB APPROVAL. If the answer is "yes," please proceed to Part A: Human Cell Lines.

PART A: HUMAN CELL LINES

☐ Yes ☒ No Does this project involve human cell or tissue cultures (primary OR immortalized cell lines/strains) that have been documented to be free of bloodborne pathogens? If the answer is "yes," please attach copies of the documentation. If the answer is "no," please answer question 1 below.

1) Please list the specific cell lines/strains to be used, their source and description of use.

CELL LINE	SOURCE	DESCRIPTION OF USE

Add New Row

2) Please refer to the ISU "Bloodborne Pathogens Manual," which contains the requirements of the OSHA Bloodborne Pathogens Standard. Please list the specific precautions to be followed for this project below (e.g., retractable needles used for blood draws):

Anyone working with human cell lines/strains that have not been documented to be free of bloodborne pathogens is required to have Bloodborne Pathogen Training annually. Current Bloodborne Pathogen Training dates must be listed in Section I for all Key Personnel. Please contact Environmental Health and Safety (294-5359) if you need to sign up for training and/or to get a copy of the Bloodborne Pathogens Manual (http://www.ehs.iastate.edu/bs/bbp.htm).

PART B: HUMAN BLOOD COMPONENTS, BODY FLUIDS OR TISSUES

☐ Yes ☐ No Does this project involve human blood components, body fluids or tissues? If "yes", please answer all of the questions in the "Human Blood Components, Body Fluids or Tissues" section.

1) Please list the specific human substances used, their source, amount and description of use.

SUBSTANCE	SOURCE	AMOUNT	DESCRIPTION OF USE
E.g., Blood	*Normal healthy volunteers*	*2 ml*	*Approximate quantity, assays to be done.*

Add New Row

2) Please refer to the ISU "Bloodborne Pathogens Manual," which contains the requirements of the OSHA Bloodborne Pathogens Standard. Specific sections to be followed for this project are:

Anyone working with human blood components, body fluids or tissues is required to have Bloodborne Pathogen Training annually. Current Bloodborne Pathogen Training dates must be listed in Section I for all Key Personnel. Please contact Environmental Health and Safety (294-5359) if you need to sign up for training and/or to get a copy of the Bloodborne Pathogens Manual (http://www.ehs.iastate.edu/bs/bbp.htm).

FOR ENVIRONMENTAL HEALTH AND SAFETY USE ONLY

Signature of Biological Safety Officer

Date

ISU IRB # 1	06-393
EXEMPT DATE:	14 September 2006
Initial By:	jlc

INFORMED CONSENT DOCUMENT

Title of Study: Silk Production in villages of the Oaxaca area of Mexico
Investigators: Careyn Armitage; Eric Mindling (translator)

This is a research study. Please take your time in deciding if you would like to participate. Please feel free to ask questions at any time.

INTRODUCTION

The purpose of this study is to learn about silk production within your family and the history of silk production in your family. You are being invited to participate in this study because you produce silk and your family has produced silk since it was introduced by Spain.

DESCRIPTION OF PROCEDURES

If you agree to participate in this study, your participation will last for as long as you want to talk to me about silk production, your family, and any stories of your family. I would like to be able to come back at another time during the silkworm cycle to talk to you again. There is some specific information I need for this study, but what I want most are your stories about how silk production has affected your family.

If you permit, I would like to take pictures of you, your family, and the silk production. I would appreciate being able to take pictures of you while your work.

RISKS

There are no risks to you or your family in answering these questions and allowing me to take pictures.

BENEFITS

I will be happy to send you copies of any of the pictures you would like.

COSTS AND COMPENSATION

You will not have any costs from participating in this study.

PARTICIPANT RIGHTS

ISU IRB # 1	06-393
EXEMPT DATE:	14 September 2006
Initial By:	jlc

Your participation in this study is completely voluntary and you may refuse to participate and end our conversation at any time.

CONFIDENTIALITY

The records of this conversation will be saved on computer disks and jump drives. The pictures will also be saved. All of the information will be published in book form as a doctoral dissertation. If there is any information you do not want included, I will respect your privacy and not attach you name if the information is used in the dissertation.

QUESTIONS OR PROBLEMS

You are encouraged to ask questions of me at any time during this conversation.

- For further information about the study contact Yvonne Gentzler at Iowa State University; (515) 294-0533.
- If you have any questions about the rights of research subjects or research-related injury, please contact the IRB Administrator, (515) 294-4566, jcs1959@iastate.edu, or Diane Ament, Director, Office of Research Assurances (515) 294-3115, dament@iastate.edu.

****

PARTICIPANT SIGNATURE

Your signature indicates that you voluntarily agree to participate in this study, that the study has been explained to you, that you have been given the time to read the document and that your questions have been satisfactorily answered. You will receive a copy of the written informed consent prior to your participation in the study.

Participant's Name (printed) _____

_____ _____

(Participant's Signature) (Date)

[Include the Parent/Guardian/Legally Authorized Representative signature line only if applicable to your study.]

_____ _____

(Signature of Parent/Guardian or Legally Authorized Representative) (Date)

ISU IRB # 1	06-393
EXEMPT DATE:	14 September 2006
Initial By:	jlc

INVESTIGATOR STATEMENT

I certify that the participant has been given adequate time to read and learn about the study and all of their questions have been answered. It is my opinion that the participant understands the purpose, risks, benefits and the procedures that will be followed in this study and has voluntarily agreed to participate.

_____ _____

(Signature of Person Obtaining Informed Consent) (Date)

ISU IRB # 1	06-393
EXEMPT DATE:	14 September 2006
Initial By:	jlc

Questions for Research

1. Why has silk production kept going in your family
2. Cycle of the silkworm – months from worm to cocoon
3. Are you raising the silk cocoons or do you receive them from the Seri center?
4. How much assistance or help is received from government agencies?
5. Are they the yellow cocoons or white ones?
6. Who raises and feeds the silk worms?
7. When did it begin? Are there **stories** about your family and its history regarding silk?
8. What do the worms eat? Are these mulberry trees that have been here for how long?
9. Who takes the process from cocoon to spinning?
10. Who does the weaving?
11. Is this your family's only income?
12. What do you do with the woven fabric/thread/yarn? Is it traded or sold?
13. If selling the yarn, why the yarn and not a woven product
14. If you trade these goods, where do you travel to trade?
15. How is the other household work divided among family members?
16. Size of family, gender, age – is younger generation wanting to carry on

Questions for Children

1. Do you help with the silk process?
2. What do you do?
3. What chores do you do around your home?

ACKNOWLEDGEMENTS

There are many people who have been very supportive along my educational journey, especially these last three years. I must first acknowledge my committee, who have guided me through this process. Francine Hultgren encouraged me to explore my topic when I took her class on qualitative methodology and has kept my methodology on course. Cheryl Hausafus, Janet Melby, and Elena Karpova have kept me focused on what is pertinent for my study. I am grateful to Yvonne Gentzler for beginning as my Major Professor and guiding me through the beginnings of the graduate program. I am especially grateful to Sara Kadolph who was courageous enough to take over as my Major Professor after I had started writing my dissertation. To all of you, thank you.

I want to acknowledge Carolyn Berry Jackson for her constant support throughout my advanced education. She has always expected the best from me and offered encouragement to go farther and take advantage of opportunities presented to me, even when I did not think I could. She has been my mentor.

The students at the academy must also be acknowledged. We went through the classes together, studied together, ate together, and discussed everything whether it was related to our class topics or not. Jeanne kept us all laughing, which was needed toward the end of the classes when we did not think we could read or write anything more. Elaine and I share a love of fabric and sewing and had many conversations on those topics. We offered encouragement to each other and helped each other keep our sanity, for the most part.

I cannot forget my family, without whom this entire journey would not have been possible. To my husband, Ric, who took over doing the laundry and preparing dinner, especially toward the end when all I did was work and type on my computer. To Dylan, my

older son, who has been very supportive and continues to tell me that I am an overachiever. To Alex, my younger son, who has also been supportive and very compassionate when I was irritable and nothing seemed to be going right.. To my Aunt Barbara and my mother who have encouraged me in many ways along this journey. I thank all of you for your encouragement. I could not have completed this task without you.